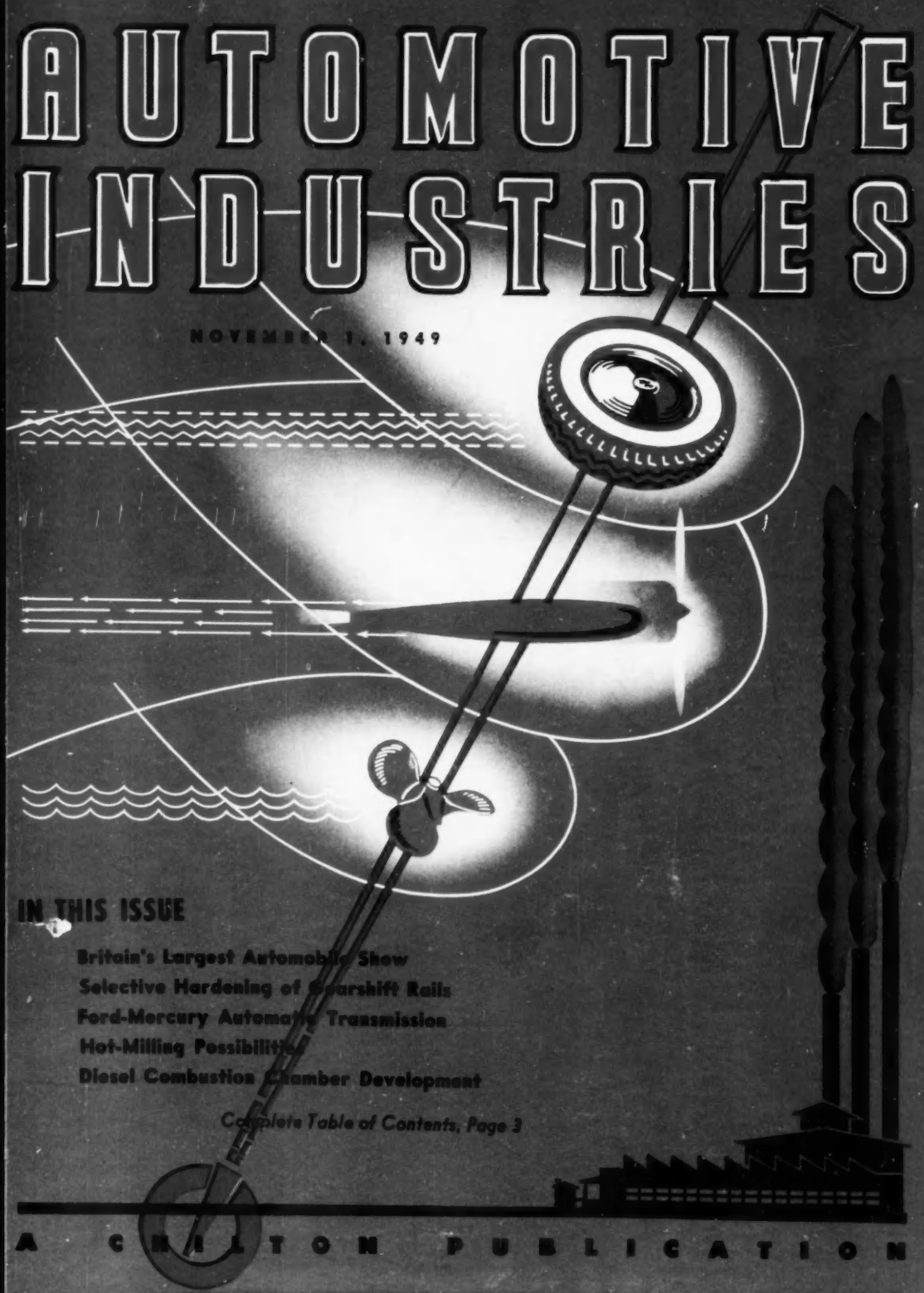
AUTOMOTIVE INDUSTRIES

NOVEMBER 1, 1949



IN THIS ISSUE

A CHILTON PUBLICATION

Stanorust Rust Preventives

Which of these rust preventives will solve your problem?

•Here are the new Stanorust Rust Preventives! Scientifically developed, thoroughly tested, proved in service . . . they are offered to you as the means to more economical and effective rust prevention in your plant. From this wide selection of grades, you can choose the Stanorust that meets your protection requirements.

STANORUST NO. 3-FP is a fingerprint remover. It can be used to remove the cause of fingerprint corrosion and deposit a protective film in one simple dipping operation.

STANORUST NO. 4-V has a Stoddard solvent base which evaporates to leave a thin film for temporary rust prevention. It is particularly outstanding for suppression of corrosion due to fingerprints.

STANORUST NO. 12 provides economical protection under average indoor conditions. It can be applied cold by conventional methods.

STANORUST NO. 95 is designed for protection of parts in moderately severe indoor storage. It has a viscosity about equivalent to an SAE 40 Motor Oil. It can be applied cold by conventional methods.

STANORUST S-1 is a semi-fluid product, designed to give protection over a longer period than the No. 95 grade. It is suitable for outdoor service, if protected parts are under cover. This grade should be heated for most economical application.

STANORUST 1-XC is a non-fluid product which is recommended for protection of parts under severe outdoor conditions. Because it has been thinned with a volatile solvent, it is applied cold with a swab or a brush.

STANORUST 3-X offers protection against severe inside storage conditions and moderately severe outdoor conditions. It is soft enough to be applied cold.

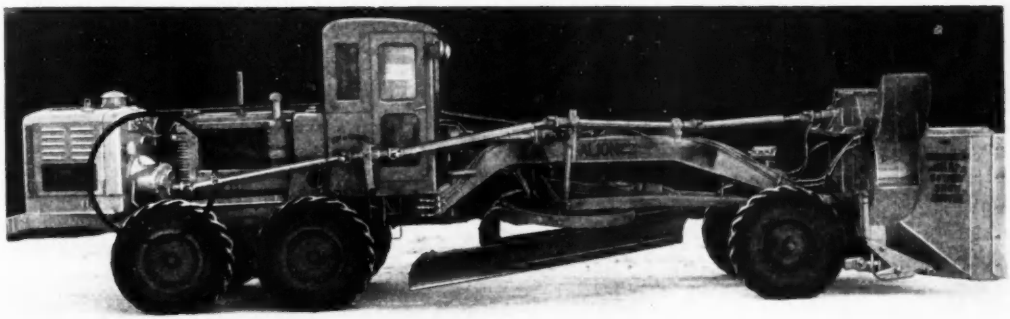
STANORUST 6-X is a heavy petrolatum-type, adhesive product that protects against the most severe outdoor exposure. It meets government specifications which include a requirement that it protect against corrosion for a period of not less than 10 years without renewal. Application is made by swabbing or dipping at a temperature of 150° to 180° F.

For more complete information about these new products, write for your copy of the Stanorust booklet. Address your letter to Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD OIL COMPANY (INDIANA) STANDARD

"Over the fence is the place for snow" says Richardson Road Machinery. Above is the Richardson Rotary Shovel Snow Plow Model 872M (mounted on an Allis Chalmers Motor Grader) which throws snow from 50 to 60 feet.

Power from the auxiliary Diesel motor, located on back of frame, is transferred through a Cotta Gear and Clutch Reduction Unit specially engineered for the Richardson application.



Cotta Reduction Units are being used on cranes, shovels, rock crushers, generators, pumps, etc. Broad range of ratios. Input torque from 150 to 1350 foot pounds. Diagrams, capacity tables, dimensions, and complete specifications sent free on request. State your problem — COTTA engineers will help you select the right unit for best performance. Write today.

COTTA TRANSMISSION CO., ROCKFORD, ILLINOIS

An Assurance of Dependable Service

COTTA
GEAR AND CLUTCH
REDUCTION UNIT
PRECISION-BUILT • SPECIALLY ENGINEERED FOR YOUR PRODUCT

FOR DEPENDABLE LONG LIFE

insist on

Nickel Alloy Steel Gears

There are two kinds of nickel alloy steel gears... those that are carburized, and those that are direct hardened.

CARBURIZED GEARS

The carburized gear is used in applications that require maximum wear resistance in the surface, as well as greatest surface compressive strength. With nickel alloy carburizing steels, this goal is consistently attained, together with development of extremely tough cores that resist shock loads, fatigue and bending stresses. Moreover, a chief cause of noisy gears... the distortion that accompanies heat treating... is inherently resisted by nickel alloy carburizing steels.

DIRECT HARDENED GEARS

The direct hardened steel gear is used to carry heavy tooth loading in applications where resistance to wear and surface compressive stresses is not quite so vital a factor. Here again, the nickel-containing steels develop the required strength more consistently and in heavier sections than carbon steels, and are generally more resistant to shock, fatigue and multi-axial stresses. Distortion resulting from heat treatment may be minimized by using nickel alloy steels and their machinability before final heat treatment is very good.

Giving greater play to the skill of the engineer, nickel alloyed steels not only provide increased strength without sacrificing ductility, but they harden at lower temperatures which simplifies heat treatment and minimizes deformation and scaling.

MEET VARIED REQUIREMENTS

Nickel alloyed steels enable producers to meet virtually any reasonable requirements . . . whether dictated by revised stress analysis due to design changes, or by changed fabricating methods that demand better machining qualities or improved response to heat treatment.

MANY TYPES AVAILABLE

The many standard grades of nickel alloyed steels permit specifying the particular type which provides the best set of properties for any reasonable fabrication and service demands.

Unending competition for higher speeds and heavier loads, for quieter operating and longer machine life, provide opportunities for gear producers to drive ahead with nickel alloyed steels. Use the coupon for your copy of "Modern Trends in Nickel Steel and Cast Iron Gear Materials." This useful and informative booklet is yours for the asking. Send for it now.

MAIL COUPON FOR VALUABLE BOOK

The International Nickel Company, Inc.
Dept. AI, 67 Wall St., New York 5, N. Y.

Please send me a copy of
"Modern Trends in Nickel Steel and Cast Iron Gear Materials"

*Name*_____ *Title*_____

*Company*_____

*Address*_____

*City*_____ *State*_____

EMBLEM OF INCO SERVICE

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

AUTOMOTIVE INDUSTRIES

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Contents

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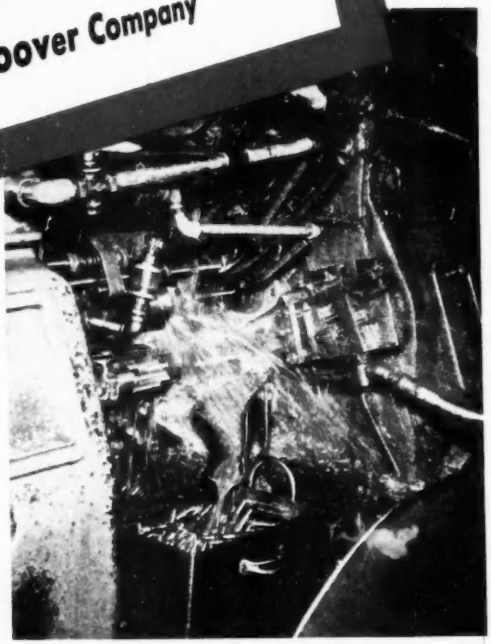
Texaco dual-purpose oil makes

A Substantial Saving

for the Hoover Company



Motor shafts for the famous Hoover Electric Cleaners are produced on this 9/16-inch Acme Gridley automatic screw machine. Texaco Cleartex Cutting Oil serves as both cutting coolant and machine lubricant.

In the North Canton, Ohio, plant of The Hoover Company, pioneer maker of electric cleaners, the machining operation illustrated formerly required two lubricants — one for the machine, the other for the cutting tools. End result was contaminated oil that had only scrap value.

A Texaco Lubrication Engineer recommended *Texaco Cleartex Cutting Oil*, designed to serve as both cutting coolant and machine lubricant. *"By using this dual-purpose oil,"* says The Hoover Company, *"the used oil can now be salvaged at a substantial saving."* In addition, *Cleartex* keeps machining efficiency high, assures excellent finish, prolongs tool life.

Texaco Cleartex Cutting Oil is only one of a complete line of Texaco Cutting, Soluble and Grinding Oils designed to do machining jobs better, faster, at lower cost.

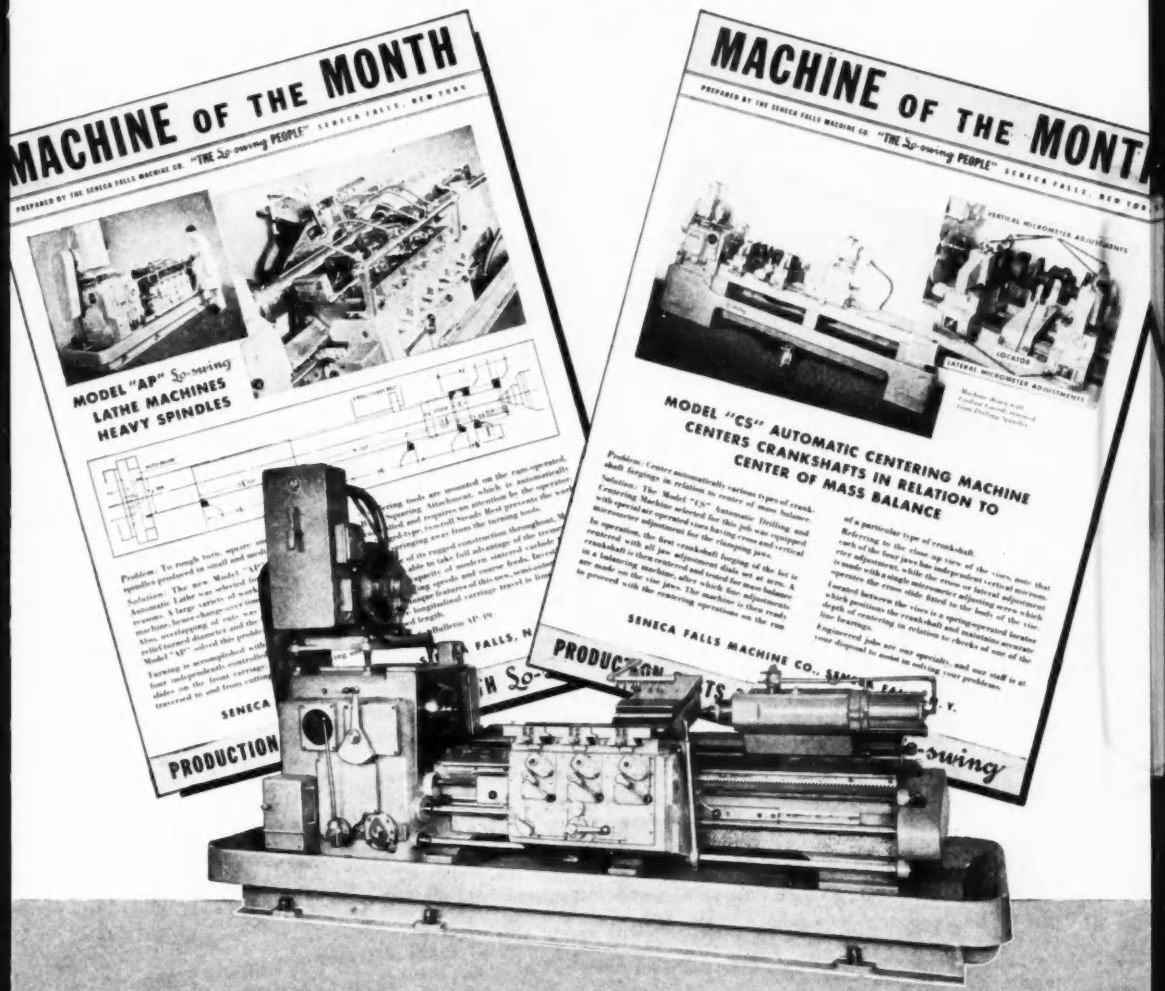
Let a Texaco Lubrication Engineer specializing in machining operations help you achieve these benefits on all your metal working. Just call the nearest of the more than 2300 Texaco Wholesale Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

TEXACO CUTTING, GRINDING AND SOLUBLE OILS FOR FASTER MACHINING

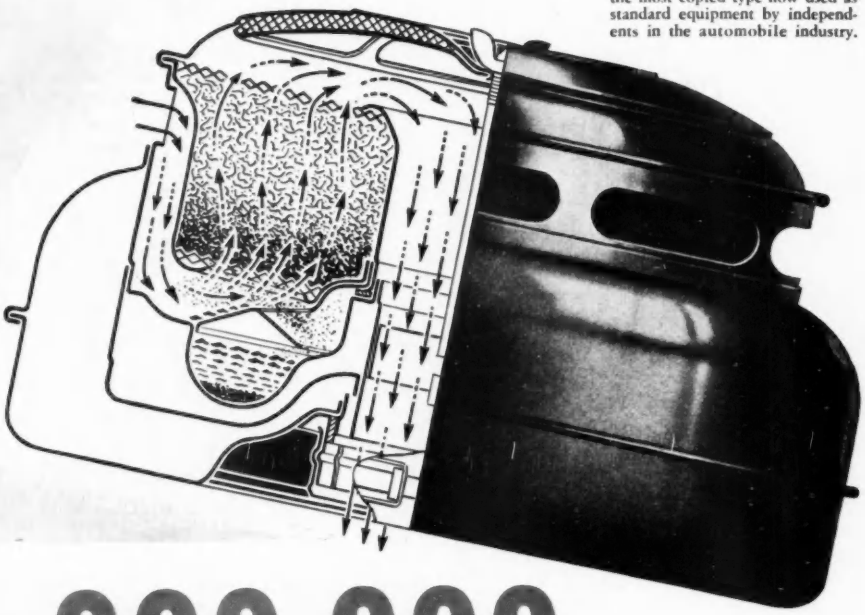
HOW DO YOU MEASURE OBSOLESCENCE?

Never lose sight of the fact that your cost must be as low as your competitor's if you expect to stay in business.



Age, by itself, is only a fair measuring stick for obsolescence. A machine tool is obsolete, when replacement by a new machine, offering production economies, will pay a substantial dividend on the net investment. Many relatively new machines are now obsolete because more efficient ones have been developed that will outproduce them at lower cost. In the last six months Seneca Falls has announced new machines which, in specific cases, are paying for themselves out of savings over methods which were *efficient* 12 months ago. ● Seneca Falls Machine Co., Seneca Falls, N. Y.

This popular combination hat type oil bath air cleaner and silencer—bulge type silencer originated by United Specialties Company — is the most copied type now used as standard equipment by independents in the automobile industry.



15,000,000

United Oil Bath Air Cleaners

United Specialties Company has produced more than 15,000,000 air cleaners — protection for every type of internal combustion engine.

- Pioneer of special air cleaner designs for passenger cars, trucks, tractors and industrial engines.
- More than 260 models — a size and type for every kind of internal combustion engine.
- United Oil Bath Air Cleaners have over 99% dirt-trapping efficiency.
- Over 25 years of close cooperation with automobile designers.
- Sales engineers always available for consultation.

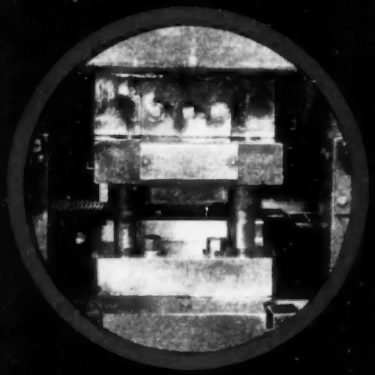
UNITED SPECIALTIES COMPANY

UNITED AIR CLEANER DIVISION, CHICAGO 28 • MITCHELL DIVISION, PHILADELPHIA 36

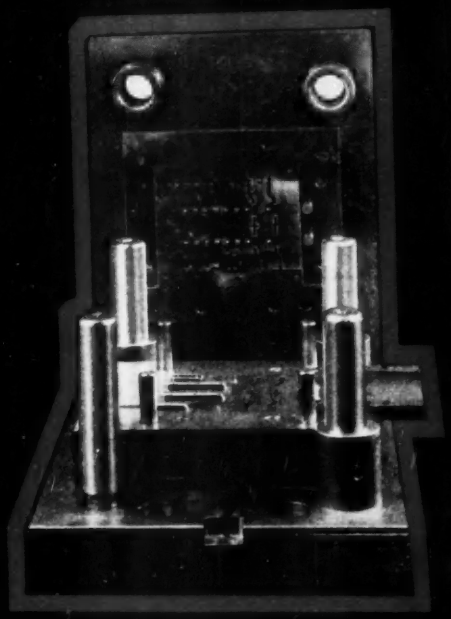
AIR CLEANERS ★ METAL STAMPINGS ★ DOVETAILS
★ IGNITION AND DIRECTIONAL SIGNAL SWITCHES ★ ROLLED SHAPES

Long range stamping program protected with

DANLY
PRECISION DIE SETS



Close-up view of the die installation in the press. Continuously fed strip stock can be seen passing through the die, emerging at the left in processed form.



A Danly Precision Die Set protects the functioning accuracy of this complex die . . . at 160 strokes a minute.

WESTERN ELECTRIC SCHEDULES 75,000,000 PARTS FROM THESE TOOLS . . . AT 300,000 PARTS PER GRIND!

Send for this Free Booklet

to see how Danly's special die set machining service can cut your costs still further.

Write to . . .

DANLY MACHINE SPECIALTIES, INC.
2100 South 52nd Avenue, Chicago 50, Illinois

These dies made at the Hawthorne Works of the Western Electric Company are an example of a tough, complicated job of die making that pays off in terms of quantity production. Eight progressive stages change the coil stock into the finished stamping—"contacts" for step by step dial telephone equipment. One set of dies and one press do work which would otherwise take several setups.

To maintain the required close clearances between punch and die, this important set of dies is protected by a Danly Die Set. This prevents premature tool wear and objectionable burring—an important consideration where parts receive no final finishing.

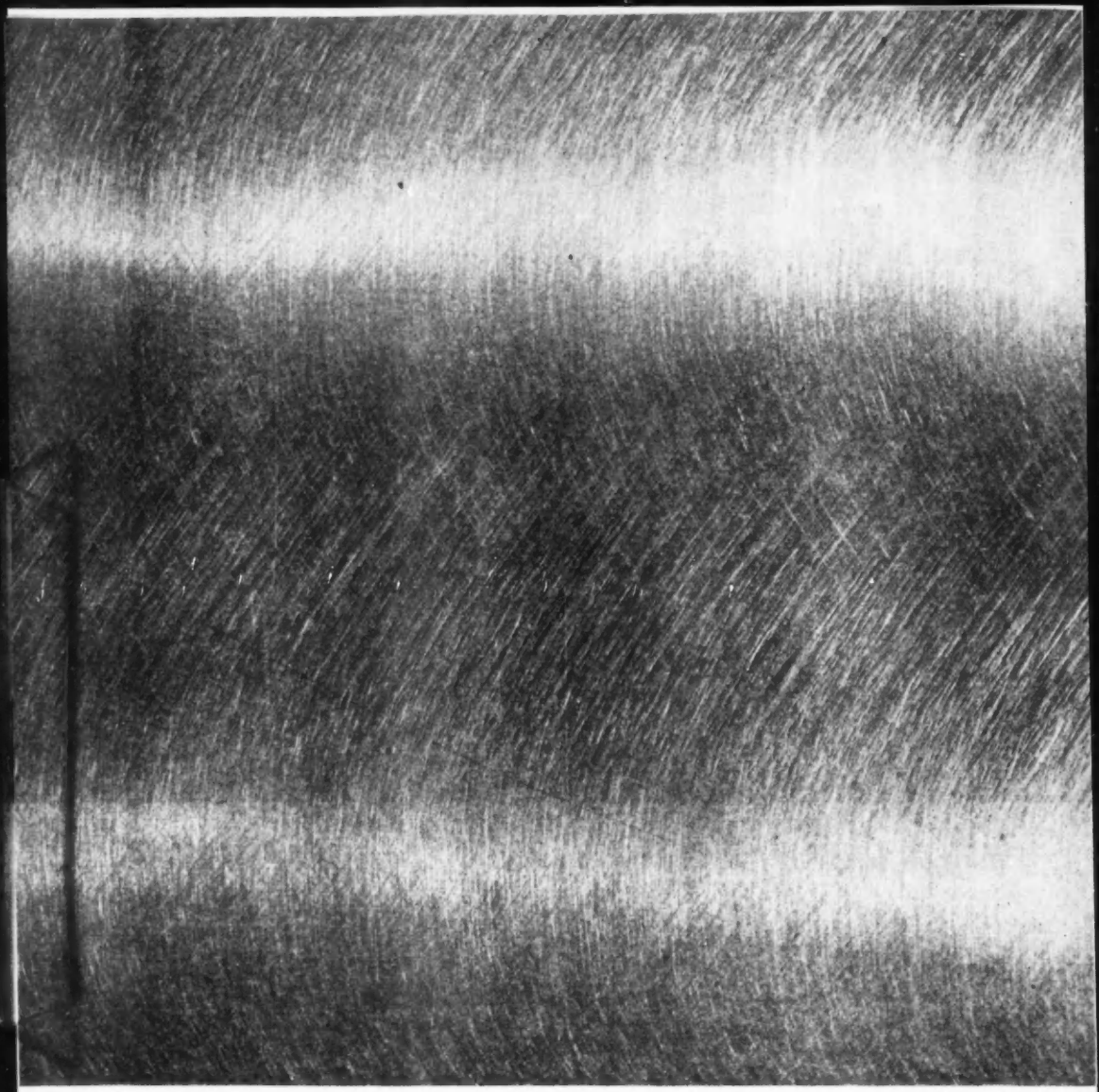
Safeguard Future Production

Only when the diemaker's precision is completely safeguarded by the die set can future production be predicted. Long range scheduling is necessary in the Electrical Industry where the output of contacts, switches, laminations and like parts number into millions. Quantity lots are standard—long range production from a set of dies must be counted on.

Danly Precision Die Sets are one important reason why customers can get the maximum number of parts per grind and can accurately predict total production. That's why it pays off to specify "Danly Precision" on Standard or Special Sets.

DANLY

Over 25 years of dependable service to the stamping industry



SUPERFINISH STARTS - OR STOPS - AT SCRATCH!

Perhaps you've thought of Superfinish only in terms of ultra-smooth surfaces. Not always! Here's one where the process has been stopped—controlled at a surface roughness of 10 micro inches. Note, in this magnification, how the abrasive grits have moved in paths which never duplicate, leaving a crosshatch pattern. For certain applications, such partially Superfinished surfaces have two distinct advantages: (1) removal of the soft "smear metal" left by grinding heat, (2) the crosshatch pattern maintains uniform distribution of lubricant to discourage spalling.

Superfinish has many other interesting applications. Write on your letterhead for the booklet, "Wear and Surface Finish."

GISHOLT MACHINE COMPANY
Madison 10, Wisconsin

THE GISHOLT ROUNDTABLE
represents the collective experience of specialists in the machining, surface finishing and balancing of round and partly round parts. Your problems are welcome here.

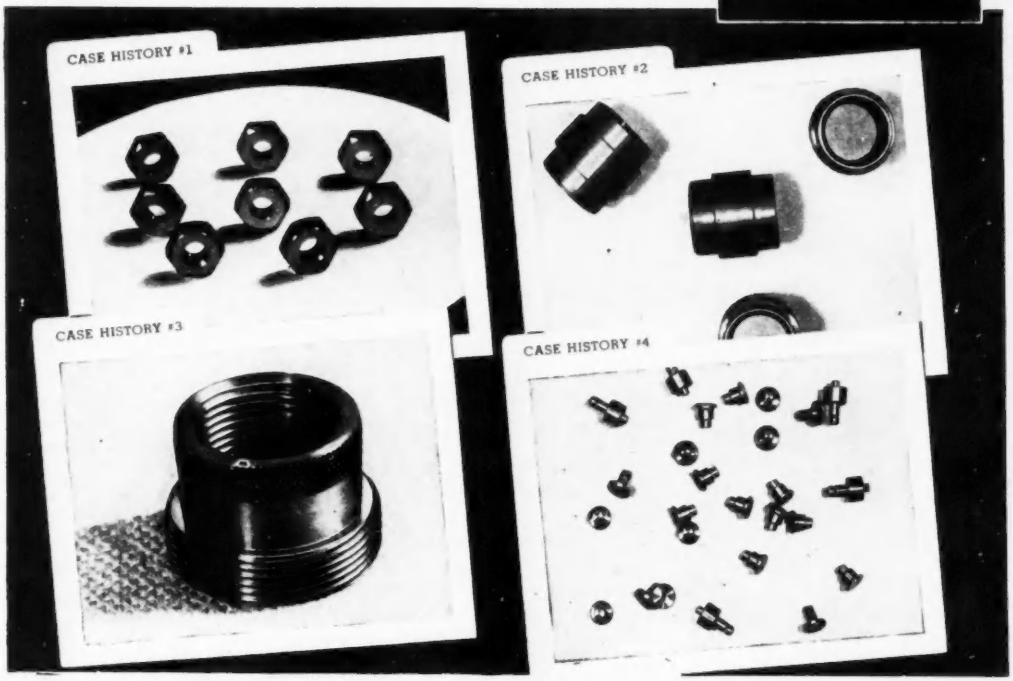
TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

Four typical machine shops report

"LONGER TOOL LIFE"
"BETTER FINISH"
"FASTER OPERATION"
} *WITH NEW*

J&L *FREE-CUTTING* "E"* *STEEL*

J&L STEEL



Four typical examples, taken from 100 case histories, show superior machinability of J&L "E" Steel.

For 4 years before "E" Steel was publicly announced, this new, free-cutting bessemer screw stock was tried by independent machine shops throughout the metal-working industry.

More than 6,100 tons were tested in over 100 applications!

Here are quotations from 4 typical case histories:

CASE HISTORY #1 ". . . tool life increased 100% at normal speeds . . . better finish . . . shop people liked it."

CASE HISTORY #2 ". . . tool life increased up to 200% . . . uniformity of finish remained constant . . . considerably increased speeds without sacrifice to finish."

CASE HISTORY #3 ". . . tool life increased two to four times . . . we were able to tap 1" full internal pipe thread, almost impossible on regular material."

CASE HISTORY #4 ". . . new steel machines very well . . . finish excellent . . . tool life increased . . . 5 to 10% better production."

You too can get greater economies in your machining operations with new J&L free-cutting "E" Steel. "E" Steel is available in three grades: E-15, E-23 and E-33, each within the composition limits of the standard bessemer screw steels and with similar tensile properties. All standard sizes and shapes are available. For further information write for your copy of our new booklet: "J&L 'E' Steel."

JONES & LAUGHLIN STEEL CORPORATION

* "E" STEEL IS QUALITY-CONTROLLED FROM OUR OWN MINES THROUGH THE FINISHED PRODUCT

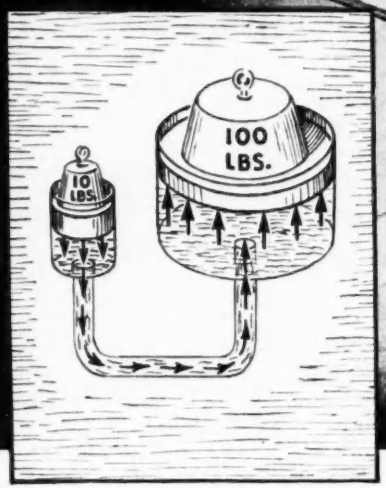
Jones & Laughlin Steel Corporation
430 Jones & Laughlin Building
Pittsburgh 19, Penna.

Please send me a copy of "J&L 'E' Steel."

Name_____

Company_____

Address_____



Hydraulics—Proved Through the Centuries —Provides *Dependable* Window Control

Hydraulic power has eased the work of man for thousands of years.

Its dependability is unquestioned.

That's why the Hydro-Lectric window regulating system, developed and perfected by Detroit Harvester engineers, can be relied upon for the life of the car. It is the "no-problem" system.

Hydro-Lectric controls are simple, compact. And one power unit can be utilized for motivating a number of mechanisms including all door windows, quarter windows, deck lid, hood, driver's seat, and convertible top.

The Hydro-Lectric system is the only such equipment now being installed by car manufacturers on thousands of vehicles daily.

* * *

Hydro-Lectric Top, Window, and Seat Control Systems
Convertible Tops • Automobile Body Hardware
Manual Window Regulators • Window Glass Channels
Power Take-Offs • Contract Production Parts
Farm Mowers • Power Sweepers

DETROIT HARVESTER COMPANY

EXECUTIVE OFFICES: 2550 GUARDIAN BUILDING, DETROIT, MICHIGAN

PLANTS: • DETROIT • YPSILANTI • TOLEDO • ZANESVILLE

Bendix Products

CREATIVE ENGINEERING

GEARED TO QUANTITY PRODUCTION

HYDROVAC

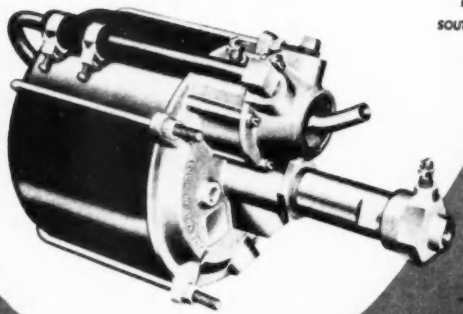
THE POWER BRAKE PREFERRED ABOVE ALL OTHERS!

More than two million installations are certainly undeniable proof of any product's popularity. In the field of power braking it means that one —the Bendix Hydrovac—is preferred above *all* others. Such overwhelming acceptance by the men who service, drive and own the nation's trucks is impressive enough in itself. It further suggests, however, that Hydrovac* power braking might very profitably be included as original equipment by most manufacturers. If you are interested in taking advantage of this great pre-sold market, write the factory direct for details on Hydrovac—the undisputed leader in power braking.

*REG. U.S. PAT. OFF.

BENDIX PRODUCTS
DIVISION of
SOUTH BEND 20, INDIANA

Export Sales: Bendix International Division
72 Fifth Avenue, New York 11, N. Y.



Combination Emergency and Parking Brake

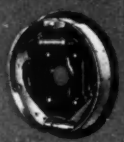
S-K* Power Braking System for Cargo Trailers

Bendix Hydraulic Power Steering

BUILDERS
OF THE BASICS
OF BETWEEN
MOTOR VEHICLES

Bendix* Automatic Clutch and Gear Shift Control Systems

Bendix Vacuum Power Gear Shifter



Bendix* Brakes for Buses, Trucks, and Passenger Cars

AUTOMOTIVE INDUSTRIES

The Authoritative Technical and News Magazine That Gives Comprehensive Coverage, Domestic and Foreign, of These Industries:

Passenger Car	Engine	Parts and Components
Truck	Body	Accessory
Bus	Trailer	Production Equipment
Aircraft	Road Machinery	Service Equipment
Tractor	Farm Machinery	Maintenance Equipment

High Spots of This Issue

The Increasing Uses of Powdered Metal Parts

How the Amplex Mfg. Co., a division of Chrysler Corp., is taking advantage of the economies of powdered metal parts, is explained in this article. The company's Oilite porous-structure parts and Oilite machined-parts are affording not only some surprising profits in manufacture but also some very definite superiorities in product quality. See page 27.

M.A.N. Diesel Development

Major events leading to the latest Diesel engine design are covered in this excellent historical sketch by P. M. Heldt. M.A.N.—Maschinenfabrik Augsburg-Nuernberg, A. G.—the German firm which built the first Diesel engine, is commemorating its 25th anniversary of its entrance into the Diesel-truck field. Turn to page 32.

Grand Canyon Economy Run

Renewed for the first time since the war, this 751-mi run will test the economy of 21 individual makes of automobiles. The run will be held from Los Angeles, Calif., to Grand Canyon, Colo., February 15-16, 1950. Here are published rules and regulations governing the contest, page 38.

Britain's Largest Passenger Car Show

Adding refinements to current models with special attention to overseas demand, Britain's automobile industry presented an excellently organized second postwar automobile show with a total of 530 exhibitors. Coverage of this big event by Special European Correspondent W. F. Bradley begins on page 24.

A Half Century of Packard Progress

In the month of November the Packard Motor Car Co. celebrates its golden anniversary as the oldest continuous maker of passenger cars under a single management in America. This article illustrates and annotates important models and dates throughout Packard's 50-year history. Page 34.

23 New Product Items And Other High Spots, Such As:

Hot-milling possibilities; selective hardening of gear shift rails in an automatic machine; features of the Ford Mercury automatic transmission; Continental's improved truck engines; steel and wood combined in a town and country body; and a report on the U. N. Conference concerning international road transport.

News of the Automotive Industries, Page 17
For Complete Table of Contents, See Page 3

Putting Sharp Teeth

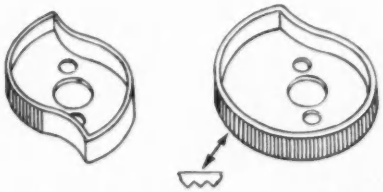
IN BUSINESS MACHINE CAMS

"Teeth must be accurately spaced and must come to a sharp point, no flats permitted" . . . said a prominent manufacturer of business machines. These basic specifications are part of the requirements for two styles of cams, illustrated in the drawing, one of which has serrations throughout an arc of 290°.

Cincinnati Application Engineers studied the job and decided that broaching was the lowest cost method. They assigned the work to a CINCINNATI No. 1-30 Single Ram Vertical Hydro-Broach, completely tooled up for production. 289 of the larger and 540 of the smaller parts are broached per hour.

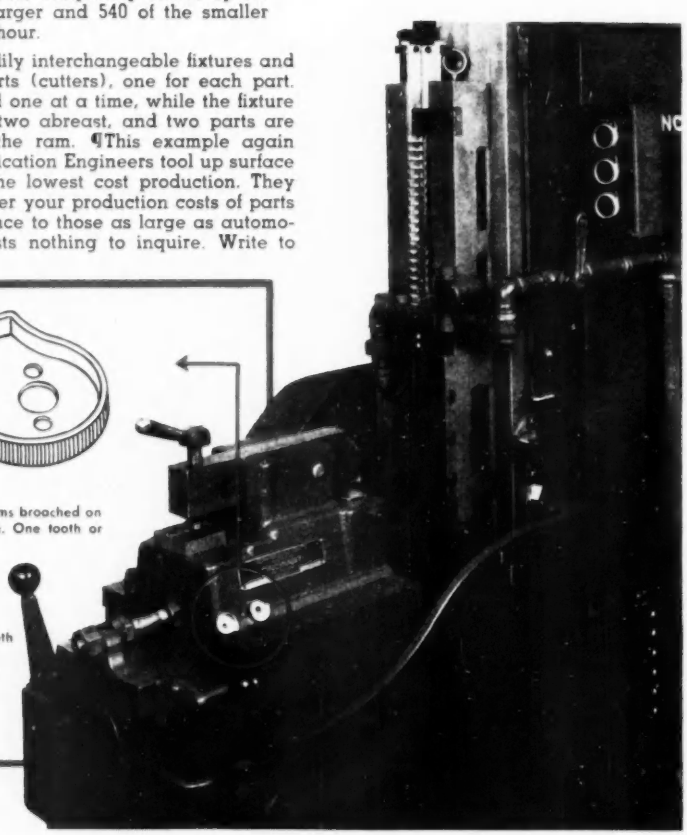
Tooling consists of two readily interchangeable fixtures and two sets of broaching inserts (cutters), one for each part. The larger cam is broached one at a time, while the fixture for the smaller cam holds two abreast, and two parts are broached each stroke of the ram. ¶This example again shows how Cincinnati Application Engineers tool up surface broaching operations for the lowest cost production. They can do just as much to lower your production costs of parts weighing less than one ounce to those as large as automotive cylinder blocks. It costs nothing to inquire. Write to Department E. S.

CINCINNATI No. 1-30 Single Ram Vertical Hydro-Broach Machine. This illustration gives you an over-all view of the machine. Write for specifications.



Drawing of two styles of business machine cams broached on the all-CINCINNATI equipment illustrated here. One tooth or segment is enlarged.

Part name	Operating cam	
Material	Steel	
Operation	Broach 82 teeth	Broach 27 teeth each side
Production	289 per hour	540 per hour
Equipment	CINCINNATI No. 1-30 Single Ram Vertical Hydro-Broach with complete tooling.	



Close-up of all-CINCINNATI equipment for broaching the serrations in business machine cams.

CINCINNATI

THE CINCINNATI MILLING MACHINE CO.

CINCINNATI 9, OHIO, U. S. A.

MILLING MACHINES • BROACHING MACHINES • CUTTER SHARPENING MACHINES
FLAME HARDENING MACHINES • OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID

NEWS of the AUTOMOTIVE INDUSTRIES

Vol. 101, No. 9 **November 1, 1949**

Car and Truck Production Hits New Yearly Peak

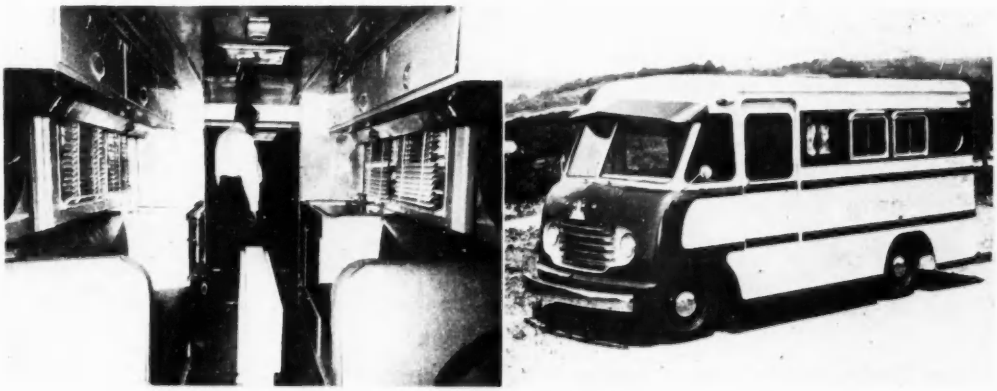
Although no official figures were available at press time, it is believed that the industry passed the 1929 production record at the tail end of October. In any event, it is safe to say that a new record has been set or will be within the first two or three days of November. However, because truck production is much greater than it was 20 years ago, the industry has still some distance to go before it exceeds the number of passenger cars built in 1923. About the middle of October, the industry was still approximately 388,000 cars short of the all-time record of 4,587,400 built in 1929. It is believed, however, that barring a complete stoppage of the industry because of labor trouble that mark, too, will fall this month. The same situation applies to domestic sales of passenger cars. The all-time record was 3,880,000 set in 1929. At the middle of October total sales this year of passenger cars was estimated at 3.5 million leaving 380,000 to go. Here again it is believed that the record will be broken some time this month. There appears to be enough cars in dealer inventories, plus what would be built by the factories, to break the record. Another important fact is that export sales of passenger cars this year are far behind the 1929 level when they averaged about 10 per cent of total production.

New Chevrolet Transmission Due in January

It has been reported that because of the steel strike the Chevrolet automatic transmission program has been delayed slightly. However, it is still thought that the new unit will be ready for announcement by the time of the GM Show in New York City about the middle of January.

House-on-Wheels Available on Ford Chassis

Pictured on this page, the new Tour Wagon, on a Ford F-3 chassis, is equipped with a regular galley stove; a 50-lb capacity refrigerator; and a kitchenette with a 14-gal water tank, sink and work space—all in stainless steel. A chemical toilet and lavatory are enclosed in a separate compartment across from the clothes closet. A special shower bath tank which can be heated on the stove is mounted above the right front entrance. A bedroom-dining room combination just aft of the driving compartment serves a triple purpose. On either side are 48-in. lounge seats. Between these is a four-ft wide drop leaf table. At meal time the table seats as many as seven persons, and at night it drops down to bed height. Bunk space for two more is provided.



BUY A HOME AND ROAM

Developed by the Boyertown Auto Body Works, Inc., Boyertown, Pa., and available through Ford dealers, the Tour Wagon (shown above), designed to provide a three-room apartment-in-one, is mounted on a Ford F-3 forward control parcel delivery type chassis. Furnished in 104 or 122-in. wheelbases the vehicle has an interior height from floor to ceiling of 71 in.; width, six ft. two in.; and length, 15 ft. It is powered by a Rouge 226, 95-hp engine, and has a road clearance of nine in.

Metal Show Emphasizes Need for Production Economy

Whether industry continues to advance all along the line might well depend upon its clear understanding of how urgent the need is for lower unit costs. This field of cost reduction in unit production has long been one of management's most serious problems since the end of the war. It engaged the concerted interest and action of industry on a national scale in Cleveland, O., during the week of Oct. 17-21, when 360 of the country's leading firms in the metals producing and metals processing fields brought the full force of every conceivable production economy before an audience of approximately 40,000 metals engineers and

other technical experts. They were the registered guests of the 31st National Metal Congress and Exposition. This Metal Show, with its colorful display of techniques, processes and equipment, was the "show how" of unit cost reduction. New machines, new methods, new processes were all in operation.

"Economy in Production" was the official theme of the Metal Show. Every activity, from the spectacular display of products and equipment, to the 291 technical papers presented at meetings, seminars, and lecture sessions, made contributions to the theme. Of special interest were two events new to the regular pattern of industrial expositions. The show management this year provided its exhibitors with theatre facilities for the showing of their industrial films. New also were the round table sessions held twice each day on different phases of Economy in Production. These panel discussions, patterned after the famous Chicago Round Table of the Air, were rehearsed previous to each meeting for smooth theatrical effect. Open forum questioning periods followed each panel period.

Packard Adds Automatic Drive to Super Models

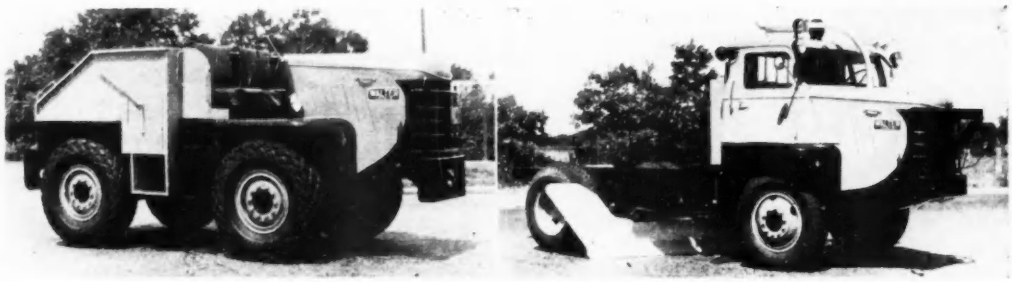
Packard has made its Ultramatic drive optional equipment at extra cost on its Super and Super De Luxe models. The automatic transmission previously had been offered only as standard equipment on Custom models. The company has also stepped up its emphasis on the Ultramatic drive in advertising coincident with completion of its $7 million expansion of facilities for volume production of the transmission.

Dodge Starts Production of Wayfarer Roadster

The Dodge Div. of Chrysler Corp. is currently in production of its Wayfarer sports roadster announced last spring. The car is now equipped with crank window lifts in place of the removable side windows as previously planned. It is believed that safety regulations in several states were responsible for making the shift to the type of window that can be quickly lowered for hand signaling.

Chrysler Announces New Crown Imperial Models

Chrysler Div. of Chrysler Corp. has announced its Crown Imperial models in two body styles: the limousine and the eight-passenger sedan. The two lines are identical in exterior design and differ only in interior appointments. In styling the Crown Imperial represents a noticeable change from the rather square lines of the rest of the current Chrysler family. It is particularly noticeable in the rear roof line which is more rounded and sloping and in the rear fenders which are longer than those of other Chrysler models, projecting beyond the bustle-back trunk in nearly a straight line. The lessened severity of styling would seem to be of more than casual significance in view of the known fact that the corporation is planning styling revisions for the 1950 line to be announced late this year or early in 1950. Factory retail price at Detroit including Federal taxes is $5228 for the eight-passenger sedan, and $5333 for the limousine. State and local taxes, handling charges and transportation are extra. An exclusive feature of the Crown Imperial models is the new hydraulic disk brake recently developed by Chrysler. With 145½ in. wheelbase and 229⅜ in. overall length, the Crown Imperial is the largest car in the Chrysler line, and is powered by a 135-hp engine and is equipped with the Prestomatic fluid drive transmission. Although announced to the public late in October, the car is still designated as a 1949 model. It is designed strictly as a luxury automobile and includes such features as power-operated window controls, electric cigar lighters in rear arm rests, rear compartment clock, satin finish nickel plate hardware fittings, and the finest quality upholstery material. The limousine is equipped with a power operated glass partition between the driver and rear compartment and black leather front seat. Both models have fold-down auxiliary seats in the rear compartment.



SNOW AND AIR

The Walter Motor Truck Co., Ridgewood, Queens, Long Island, N. Y., recently announced their new model FZMA Airplane Tractor (left), and Model AEB Snow Fighter (right). The four point positive drive Airplane Tractor is powered by a six-cyl, 125-hp engine, has a GVW of 16,000 lb, and a 90 in. wheelbase. The four point positive drive Snow Fighter has a six-cyl 150-hp engine, and a GVW of 32,000 lb. Model AEBD has a 126 in. wheelbase, and model AEBL, a 150 in. wheelbase.

Crosley Had $1 Million Loss for Year

Crosley Motors, Inc., has reported a net loss of $1,030,309 for the year ended July 31. For the previous year, the company had a net profit of $1,436,854. Net sales for the current fiscal year totaled $14,640,828 as compared with $25,391,626 for the previous year.

Int'l Harvester Combines Testing in Arizona

Leased from the Arizona State Land Dept., an area which has been used as a testing ground for International Harvester Co.'s line of industrial power equipment since 1946, will become the site of a combined test facility for its Industrial Power and Motor Truck Divs. The tract of land consists of over 4000 acres, located about 23 mi south of Phoenix in the foothills of the

NEWS *of the* AUTOMOTIVE INDUSTRIES

JAM CUTTER

In unveiling a Crosley cab (foreground, in front of a standard-sized taxi) of three-passenger capacity, George Sauvigne of Fine Cars, Inc., New York distributor for Crosley Motors, said that growing traffic congestion and jamming, the high cost of hacking, and the fact that the average Manhattan taxi load is only 1.6 passengers justify at least a tryout of smaller cabs than present regulations allow.

Salt River Mountains. A new building, containing more than 9000 sq ft of floor space, has been constructed to serve as headquarters for the motor truck testing facility, and a similar building has been in use by the industrial power personnel since the start of their project in 1946.

Douglas to Make Parts for Chevrolet

Douglas Aircraft's Pressed Metals Div. has just signed a contract to manufacture all deflectors and right- and left-hand baffles for Chevrolets assembled at the GM California plants. This order marks the first time large stampings have been sub-contracted by Chevrolet on the West Coast, according to a Douglas official. Negotiations are under way with other automobile manufacturers for similar work.

K-F Again Closes Down to Reduce Car Stocks

The Kaiser-Frazer Corp. shut down its production operations beginning Oct. 24 for an indefinite period, the fifth suspension this year. According to Edgar F. Kaiser, president, the shutdown is not to make a model change. He said that dealer inventories are at a low level and that expected sales volume would quickly exhaust current factory stocks resulting in an early resumption of production.

RFC has granted a $10 million loan to K-F to aid in financing the K-F dealer organization. It is reported that K-F may set up something similar to the GM Holding Corp. which helps finance new dealers and strengthens established dealers who need credit. The latest loan brings the total of loans granted by the government to K-F since the first of October to $44.4 million and the financing for this year to more than $69 million.

Further details on the $34.4 million loan are that if is to run for 10 years at four per cent interest. It is also reported that more than $4 million of the money is to be used for tooling a new smaller car, and $18 million for retooling the present line. The remaining $12 million will be used as working capital. Collateral for the loan is said to be the Willow Run plant, new tools and equipment to be purchased, and in addition certain assets of the Kaiser Family. Tools and equipment currently on hand are under a chattel mortgage to the Bank of America and the Mellon National Bank as security for a previous loan. Last December the company signed a contract with WAA to buy the plant and that agency is reported to have agreed to take a mortgage secondary to the one held by RFC.

Kelsey-Hayes Leases Plant in Los Angeles

Kelsey-Hayes Wheel Corp. is reported to have leased a 120,000 sq ft plant in the Los Angeles industrial area. The company manufactures automobile and truck wheels, brakes, and hubs.

Auto-Lite Opens New Plant in Hazleton, Pa.

Built and equipped at a total cost of about $3.5 million, a new wire and cable plant operated by the Electric Auto-Lite Company of Toledo, O., was recently dedicated in Hazleton, Pa. The plant will produce automotive and industrial wire and cable. Among the important products will be aircraft wire, magnet wire, lead wire, and various cables. Composed of three buildings, the plant has approximately 180,000 sq ft. of floor space. Of the total cost, $500,000 was contributed as a gift by the people of Hazleton. Another $700,-

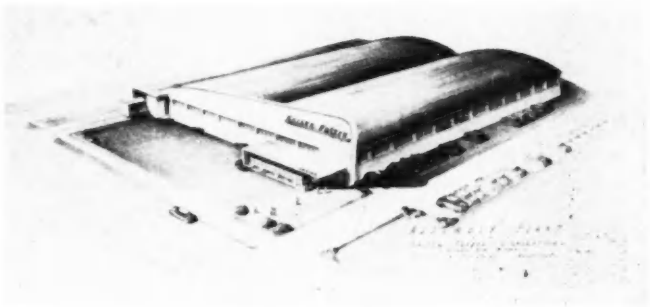
GRAIN CUTTER

The new Massey-Harris self-propelled Super 27 combine, shown above, can cut up to 70 acres of grain a day. Available in 16, 14, and 12 ft cuts, this new combine together with the Super 26, with a 12 or 10 ft cut, has 24 controlled speeds, and can travel as fast as 1½ mph through good fields.

000 was raised by the Hazleton Development Corp. and applied toward construction of the plant. Auto-Lite has invested more than $2,175,000 to complete construction and equip the plant.

Car Builders Got Record Steel Supply in First Half of '49

Larger than in any previous half-year, shipments of steel products to automotive manufacturers in the first six months of 1949 totaled nearly 5.9 million tons. This was nearly one million tons or 20 per cent greater than in the first half of 1948 and 600,000 tons over the second half of 1948. The half-year shipments were equal to more than 17 per cent of total steel shipments, compared with 15.2 per cent in the first half of last year, according to the American Iron and Steel Institute.

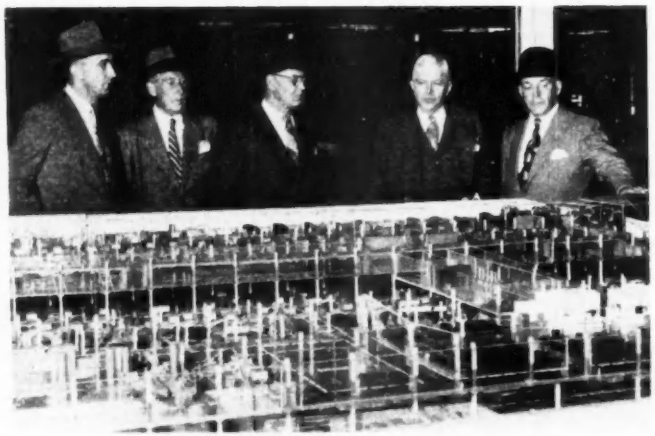


FIRST FOR THE WEST

Kaiser-Frazer Corp. has started construction at Portland, Ore., of the first (shown in the above architect's sketch) of a series of small assembly plants. The new $350,000 unit will be built for K-F by the Union Pacific Railroad and leased to the company. With 50,000 sq ft of manufacturing space, it will be erected on a 5½-acre site, is to be completed early next year, and will have a production capacity of 20 cars a day.

Pension Pressure Mounts Against Toledo Firms

The UAW-CIO pension drive has swung into high gear against automotive suppliers in the Toledo area. The first proposal was that all companies in the area under contract with the union would be blanketed under an area wide pension fund. However, the proposal has been making no progress, and talks with leading companies such as Willys-Overland and Champion Spark Plug are on an independent basis. The area wide plan proposes that all companies pay 10 cents an hour for each employe into a fund to be controlled by a board of governors represented by one member of management and one from the union from each company. Employers are not only opposed to the area-wide plan, but many of them are also against the non-contributory principle.



MANAGEMENT AND THE MODEL

This three-dimensional scale model of the new Oldsmobile final assembly plant now being built, which will have a rated capacity of 80 new cars an hour, is being inspected by C. E. Wilson (second from right), GM president; H. H. Curtice (second from left), GM executive vice-president; and S. E. Skinner (extreme right), GM vice-president and general manager of Oldsmobile. Others in the picture are: D. C. Burnham (extreme left) manufacturing manager of Oldsmobile, and T. C. Downey (center) works manager.

Gulf Oil Dedicates New Laboratory

Called the Leovy Laboratory of Geophysics, what is described as the world's most modern and complete building to be used entirely for the scientific direction of oil prospecting operations and research was dedicated recently at Harmarville, near Pittsburgh. It is the largest of more than 40 buildings erected on a 57-acre research center tract by the Gulf Research & Development Co., a subsidiary of the Gulf Oil Corp.

Twin Coach System Ventilates at Rate of 6800 CFM

The Twin Coach Co. has announced a new system which can ventilate a coach at the rate of 6800 cfm without the use of auxiliary power. Using both ram and power intake of fresh air, the system consists of four dual fan assemblies evenly spaced along the Twin Coach roof, which deliver 3600 cfm of air even when the coach is stationery, and body louvers in the front through which 3200 cfm of air is forced when the coach is running at 15 mph.

Steel Strike Curtails Vehicle Production

With the steel strike still in effect, automobile manufacturers late in October were watching dwindling steel supplies with an apprehensive eye. Some of them had already been forced to cut production, and others were looking forward to curtailed operations in November. Packard early in the month went to half rate production. Willys

had closed for an indefinite period because of the steel shortage, and by Oct. 24, GMC Truck & Coach was on a four-day week. Other manufacturers were estimating that they could continue to operate for various periods ranging up to the end of November, if not forced to suspend earlier in the event of a stoppage of supply from a key vendor. There had already been some fancy footwork done by expediters for one of the largest companies in order to get a supply of frames rolling into the plants. Sooner or later, however, companies were expecting that a key item would come up missing in the production flow and halt operations. GM estimated that beginning early in November it would be required to go on a four-day week, at least part of the time in some plants. Ford will close down manufacturing operations on Nov. 11, and assembly lines will stop on the 15th. Chrysler is expected to cut back production on all lines except Plymouth shortly after the first of the month, with Plymouth also being affected a little later. Introduction of new models also might be delayed because of the strike since it would take longer than previously planned to build out current model runs. Ford is planning to go ahead with the model change on schedule about the middle of November, since enough of the 1950 models will have been built by that time to supply dealers, but it is possible that GM and Chrysler may be delayed somewhat. It is still thought, however, that GM will have new models ready for showing at the show in New York City the middle of January.

United Kingdom Made 196,000 Cars in First Half of '49

The United Kingdom produced 196,709 passenger cars in the first half of this year, compared with 169,956 in the same period in 1948, according to the Dept. of Commerce. Exports in the first half of this year totaled 100,112, of which the United States received 3084, a considerable decrease from the 8285 received in the same period last year.

Chevrolet Appoints Haley Purchasing Director

Gerard M. Haley has been appointed director of purchases for GM's Chevrolet Motor Div. Formerly purchasing agent at the Central Office, Mr. Haley replaces R. G. Ford who had previously been promoted to manager of assembly plants. He has been succeeded as Central Office purchasing agent by E. F. Gormsen, formerly purchasing agent at the Chevrolet Gear and Axle and Forge plants in Detroit.

To Hold Roadster Show in California

The National Roadster Show will be held in Oakland, Calif., Jan. 19-22, 1950. More than $5,000 in trophies and merchandise awards are announced for leadership in roadster beauty, construction, originality and novelty. An 8½ ft trophy will go to "America's most beautiful roadster."

Fiat Planning New Models and Plants

At the Levant Samples Fair Automobile Show at Bari, Italy, the Fiat Company displayed a new Fiat truck 640 RN with its bus version, designed to reach a speed of about 50 mph. According to information circulating in Italian industrial quarters, Fiat is to complete its new six-seater and 1400 car with the engine mounted behind by next April.

It has been announced that Fiat is negotiating with the Iranian Government for the construction of a Fiat car assembling plant at Bender Abas in the Persian Gulf as Fiat has secured an important order for trucks for the Iranian Government.

A Fiat automobile assembly plant is reportedly to be built soon in Barcelona, Spain, to be supplied from Italy. Later a manufacturing plant will be established, it is understood, to produce 10,000 units a year.

Expect to Fly New XF-93 Next January

North American Aviation's XF-93 penetration fighter, a development of the F-86, is expected to fly about next January. A single-place plane, it will have side air intakes instead of a nose duct as has the F-86.

Open New Exide Plant in Atlanta, Ga.

With a capacity of from 1200 to 1400 automobile batteries a day, a new plant devoted to the manufacture of Exide batteries was recently opened in Atlanta, Ga., by the Electric Storage Battery Co., Philadelphia.

Tucker Reorganization Deadline Extended

Federal Court in Chicago has granted the trustees of Tucker Corp. a further extension until Dec. 7 to file recom-

Acme

HEAVYWEIGHT HANDLER

This new Automatic Transportation Co. lift truck, capable of handling 110,000 lb loads, is shown raising a highway trailer with four automobiles. The truck will be shipped to GM's Oldsmobile Div., Lansing, Mich., to handle huge automotive dies. At its broadest point it is 85 in. wide and has an overall length of 184 in.

mendations for reorganization of the company. The extension is the third since the trustees were appointed. Meanwhile, Preston T. Tucker, president of the company, and seven other defendants charged with conspiracy, violations of the Securities Act, and mail fraud went to trial for the second time Oct. 17. A mistrial was declared shortly after the first trial was underway when a witness referred to one of the defendant's previous prison record.

Army and Navy Announce New Automotive Contracts

The Dept. of the Navy has announced that the Bendix - Aviation Corp., Eclipse-Pioneer Div., has received a $351,140 contract for 816 starters and a $124,780 contract for 2280 voltage regulators. The Dept. of the Army has disclosed that it has granted a $178,800 contract to Continental Motors Corp. for six eight-cyl engines.

Boeing and Convair Get Joint USAF Order

Boeing Airplane Co. and Consolidated Vultee Aircraft Corp. have been awarded a joint order for tooling and construction of 20 B-47-type inboard power "pods" by the U. S. Air Force Air Materiel Command. Under the joint subcontracting program, Convair will do the necessary tooling, hammer and stretch-press and machine shop work. Boeing will receive the tools from Convair and will do all of the assembly and detailed part work.

Ford of Canada Hit Output Record in September

September was the biggest production month in the last 20 years for the Ford Motor Co. of Canada, Ltd., and the number of vehicles manufactured for the Canadian market was the highest since May, 1926. Combined export and domestic production in September totaled 11,181 passenger cars and trucks, highest since 1929, with 9468 units going to the domestic field. This brought Ford of Canada's output for Canadian customers to 71,122 vehicles in the first nine months of 1949, more than in any previous full year in the company's history.

Government Modifies Specs for 4 x 2 Trucks

The Federal Government Specifications Board has modified its specifications for 4 x 2 trucks of 15,000 lb GVW and up. The board's technical committee on motor vehicles is recirculating truck manufacturers asking them to comment on the proposed modifications.

Federal Reserve Sees Possible Car Sales Record in 1950

Sales of both new and used cars next year may well exceed this year's record totals, according to the Federal Reserve Board. Not only did talk of a business recession earlier this year fail to make a dent in the public's demand for automoblies, but surveys reveal that there will be as great or greater a demand in 1950. As the board puts it, "The stated intentions of the public to buy automobiles, houses, and other durable goods in the period from July, 1949, to June, 1950, indicated no marked decline in sales of these goods. There were only scattered indications of any weakening in purchase plans for new automobiles. However, the majority of prospective automobile purchasers reported they would postpone their purchases until the first half of 1950," the board states.

Wright Building Ram Jet Laboratory

A $600,000 ram jet laboratory for testing supersonic engines is being built at the Wright Aeronautical Corp.'s plant in Wood-Ridge, N. J. It will reportedly be the largest of its type to be operated by a private concern.

Isotta Fraschini to be Reorganized

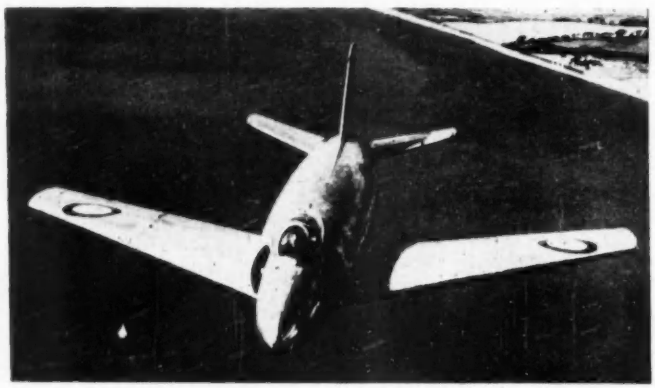
Isotta Fraschini of Milan, Italy, is to be reorganized with the reduction of 5000 workers, and the taking over of the capital by an Italo-Brazilian group controlled by Count Materazzo of Rio de Janeiro which is to develop the output of utility cars, trucks and motor vehicle Diesel engines.

Stratojet Flies With New Jet Engines

Boeing's XB-47 Stratojet completed its first flight using new and more powerful engines. The U. S. Air Force medium bomber, now equipped with six GE J-47 turbo-jet engines, is said to have more than 25 per cent additional power.

Packaging & Mat'ls Handling Show Held in Detroit

The Second Packaging and Materials Handling Institute conducted jointly by Wayne University and the Society of Industrial Packaging and Materials Handling Engineers was held in Detroit during the week of Oct. 3. That scientific methods of packaging have come of age was attested to by the variety of exhibits in conjunction with the Industrial Packaging and Materials Handling Exposition staged at Detroit's Convention Hall Oct. 4, 5, and 6. This marks the first trade show in the protective packaging field to be held in the automotive center. Exhibits covered the gamut of modern packag-



British Information Services

SUPERSONIC SECRET

The new Vickers Supermarine 510 jet fighter (shown in outline on page 22, Sept. 15th AUTOMOTIVE INDUSTRIES), was exhibited recently at the British Aircraft Constructors Display, Farnborough, England. The Royal Air Force is to be equipped with the plane, still on the secret list, which is claimed to be capable of reaching a speed faster than sound.

ing methods, including corrugated or solid fibre boxes, nailed wood boxes, and wirebound boxes. Others featured packing machines of various types and sizes, stapling devices, steel strapping tools, labels, case sealers, dispensers for adhesives and labels. Born of war experience were the variety of materials designed for protective export packaging: paper, adhesives, rust preventive materials, cartons and crates, water vapor barrier for control of humidity, and packing pads and cushioning materials.

Leyland Begins to Build South African Plant

Leyland Motors (S.A.), Ltd., England, has begun construction of its new assembly plant at Elandsfontein, some 10 miles east of Johannesburg. It will become the new Leyland headquarters in South Africa. Bulldozers have leveled part of the 34-acre site and building operations have started for a factory which will cover over 80,000 sq ft of floor space, and which will comprise assembly, spares, repairs and service plant as well as an administrative block and canteen buildings.

Official Dept. of Defense Photo

TRI-JET

Shown here is the Air Force's newest jet bomber, the XB-51, built by the Glenn L. Martin Co. A three-jet, light bomber, the XB-51 is designed for short range tactical missions in support of ground forces. Powered by three turbo-jet engines, two mounted at the lower sides of the fuselage beneath the cockpit, and a third in the rear of the fuselage, the plane's approximate dimensions are wingspan, 55 ft; length, 80 ft; and height, 17 ft.

Willys Names Montgomery General Parts Manager

Robert Montgomery has been made general parts manager of Willys-Overland Motors. Since last June, he had been assistant to Delmar G. Roos, first vice president and operating head of Willys. He succeeds August Benhoff who has been associated with the company for the past 45 years, the last 36 years as head of the parts department. Mr. Benhoff will remain with the company, however, to assist Mr. Montgomery in an advisory capacity.

FOUR FOR FIFTY

The new 50-passenger C102 Avro Jetliner transport is powered by four Rolls-Royce Derwent jet engines each developing 3500 lb static thrust. It has a maximum cruising speed of 427 mph at 30,000 to 35,000 ft, with a gross weight of 60 000 lb. The new plane's span is 98 ft, 1 in., and length is 82 ft, 9 in.

UN Completes New Road Traffic Treaty

The United Nations World Conference on Road and Motor Transport has completed a new treaty on road traffic. Covering primarily automobile traffic, the new treaty still has to be ratified by the 21 signatory nations. Designed to ease international automoblie travel, some of the more important sections of the treaty call for a standard international driver's license and a distinctive plaque on the rear of vehicles to show the country of origin. There are also a few basic mechanical requirements relating to brakes, lights, and other equipment. While excluding for-hire operations by trucks and buses, the treaty also contains new standards relating to maximum vehicle weights and dimensions. These new standards reflect the American point of view and were offered by U. S delegates to the Geneva meeting.

The most important of these standards relates to sizes and weights. The maximum axle load in the new treaty was fixed at eight metric tons or 17,600 lbs, slightly under the 18,000 lb limit, advocated by the American Association of State Highway officials. Gross weight for any vehicle or combination of vehicles is fixed by a table based on distance between axles, as suggested by American delegates. The range of weights in this table is from 32,000 to 80,360 lb. Maximum dimensions set forth in the same annex are very close to U. S. standards: width, 98 in., height, 12½ ft; length of a two-axle truck, 33 ft; length of a two-axle bus, or of any three-axle vehicle, 36 ft; length of a tractor-semi-trailer, 46 ft; length of a truck and one full trailer, 59 ft; and length of a truck and two full trailers, 72 ft.

Fleet Accounts Purchase Third of All Trucks

According to figures compiled by a large truck builder, fleet accounts buy about 35 per cent of total truck production. It is interesting also to note that sales of passenger cars to fleets last year ran about 18 per cent of the total, but currently is down to about 10 per cent which is considered normal.

(*Turn to page* 58, *please*)

Triumph Mayflower made by the Standard Co. Note the new "knife-edge" design of body and fenders.

LONDON, ENGLAND

WITH a total of 530 exhibitors, of which 52 were in the passenger car section, Britain's excellently organized second postwar automobile show was the biggest ever and also the most international. Public interest was high, as was shown by 3652 paid visitors in the first hour. In addition to the 32 British car manufacturers, the United States and Canada were represented by 16 makes, France had eight makes and Italy two.

Underneath this fine display there were some raw spots. While Sir Stafford Cripps was insisting on greater effort on the part of everybody; while Minister of Supply Strauss was advocating an increase of 100 to 200 per cent in exports, while F. I. Connolly, president of the S.M.M.T., was urging that the five and a half day week be adopted, the show fitters staged a strike. By a compromise at the last minute and with the help of workers brought from the automobile factories, the main hall had a smart and finished appearance when the gates were thrown open. In the vast galleries, however, conditions were more or less chaotic for 24 hours.

Manufacturers seem determined to win through, but they do not hide the fact that they are up against a tough proposition. Leaders are calling for more steel, less control, greater individual liberty in the management of their business, in order to enable them to expand both their home and their foreign markets. The would-be buyer is in a sad position. He is told that he will have to wait still longer for a new automobile, and when it comes its cost probably will be higher than at present.

While the show was international, only the British cars were for sale—and that abroad. Complicated regulations govern the foreign cars. American repre-

Britain Stages *Its Largest* Passenger Car Show

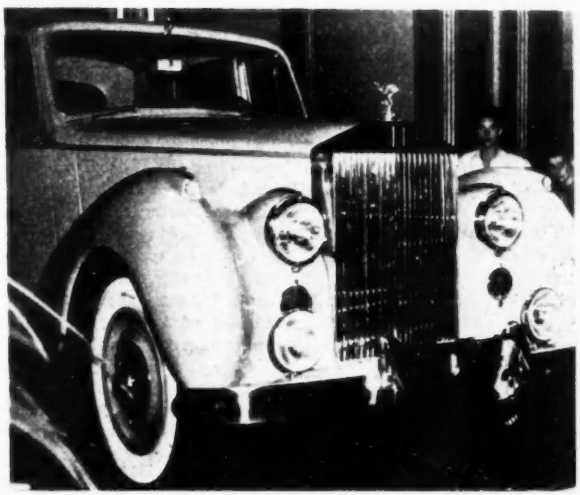
Britain's Automobile Industry Has, in General, Employed the Past Year in Adding Refinements to Current Models with Special Attention to Overseas Demand. Theme of the London Exhibition was "Consolidation".

By W. F. Bradley
Special European Correspondent for Automotive Industries

sentatives stated that the exhibition models will be sent out of the country; that they may be absorbed in their own organization; that they may be sold to diplomats; or that they may go into the hands of some very fortunate individuals who can perform the mircle of coaxing an import permit out of the Board of Trade. Some representatives said they have secured permission to sell their exhibition models only, others stated that they will have to wait to get a decision, while some others said that the cars they have brought to London will go to British Possessions—or Ireland.

Continental makers—France and Italy—appear to be hoping for preferential treatment, but there does not appear to be much to justify that hope. Fiat made a big display of its three production models, but after applying for gasoline for demonstration purposes found that such complicated log books had to be maintained that the idea was given up. Lancia came for the first time since before the war and at the last minute the Alfa Romeos were withdrawn.

Citroen has not ceased to assemble in England and is on the same footing as British makers. Renault has just received a permit to assemble and will concentrate on the rear-engine job. This will be imported completely knocked down. The engine will be sent complete, transmissions will be completely machined, the body will be in panels and will be welded in England. Most of the fittings will be of English origin. It is expected that production will be 25 cars per day before the end of the year, and of this total 75 per cent must be exported. Peugeot, Delage, Delahaye, Hotchkiss and Panhard are making an effort, or are preparing in the hope that European inter-aid will become a reality. Up to the present there is nothing definite to indicate that this will be the case, although before the show ended goods



Rolls-Royce Silver Dawn, an "export only" model. It has left-hand drive and a steering column gear shift lever.

New six-passenger Rover 75. It is claimed that overseas orders for this model are already sufficient to absorb the factory output for the next six months.

admitted free of licenses did include motor cycles.

Having put all its new material on the counter a year ago, it was not to be expected that there would be much novelty in this second show. Rather it is a display of refinements and improvements as suggested by one year's experience of vehicles in the hands of users. Not more than four or five cars are entirely new. There are no new tendencies, for the British designer evolves conservatively and, speaking generally, will not adopt a new idea until somebody else has proved that it is sound.

There is no move at all toward automatic transmissions, the only important alternative to the conventional type of four-speed transmission being the Wilson pre-selective epicyclic type used on the more expensive cars, such as Daimler, Armstrong-Siddeley, etc. The tendency for this, however, appears to be rather toward buses, trucks, railcars and other heavy units and development is aimed at the use of compressed air or oil to operate the bands.

Hobbs Transmission Ltd. showed a planetary, hydraulically controlled, semi-automatic transmission system which, it is stated, is under test by various British manufacturers. Weight and area are no greater than those of a standard transmission and production costs should be only slightly higher. Abolishing the clutch pedal, control is by means of a lever providing the four ratios, any of which can be engaged whatever the position of the throttle.

Overdrives have not appeared on British cars, probably because they offer no great advantage on narrow and crowded English roads. They are to be found on the Lancia (fifth overdrive) and on Peugeot and Panhard (fourth overdrive).

In the 1950 type Rover has broken away from convention, has discarded the familiar radiator and has adopted entirely new styling. Mechanical changes are a new aluminum cylinder head with built-in manifold, and two horizontal carburetors in place of the dual downdraft formerly used. The result is claimed to be a 10 per cent increase in maximum horsepower.

Instead of the side rails which stopped short at the rear spring attachment, a full length frame of box section with five cross members is now used. The engine has been moved farther forward and given an increased rearward tilt. The transmission shaft is in two sections, with a central flexibly-supported bearing above the cross frame members.

Styling has been designed to give additional passenger room on the 111-in. wheelbase chassis. The rear seats now are completely ahead of the rear axle. A one-piece fixed curved windshield is used and an air-conditioning system is standard equipment.

Although body space has been increased, changes in design and the use of light alloy for hood and nonstressed body panels have resulted in a weight saving of about 100 lb. This, with increased engine power, has made it possible to change the rear axle ratio from 4.7 to 4.3. Tire size is 6.00-15.

All Nuffield models were new last year, so changes for 1950 are of a minor nature. The Morrix Oxford now has a pressurized cooling system and a six-blade fan. A renewable-element oil filter, without external pipes, has been fitted. Diagonally-mounted direct-acting shock absorbers are now used at the rear, and second and third gear ratios have been modified. Wheels and brake drums are integral.

Changes in the Wolseley and the Riley models are limited to interior styling. There is, however, a new 152 cu in. convertible coupe for export only, and a 75 cu in. M.G. runabout also reserved for foreign markets.

To meet foreign requirements, Armstrong-Siddeley has increased engine size from 122 to 141 cu in., but as English tax is no longer on cylinder bore, only one model will be built, this having six cylinders of 2.8 by 3.94 in., with wet liners, and overhead valves with hydraulically-operated tappets. The new engine gives a 12 per cent increase in maximum torque, while gas consumption remains unchanged. A choice is offered of synchromesh transmission or the Wilson pre-selective epicyclic type. Four body styles are featured.

Linking up with E.R.A., the racing car specialists, the Jowett Co. has produced a sports car of outstanding merit. The task was to build a sports car embodying the greatest number of Jowett components, but Prof. Robert von Eberhorst, formerly associated with Dr. Porche in the production of Auto Union racing cars, appears to have been given a considerable amount of liberty in the design of the new machine.

The chassis frame is entirely tubular construction, consisting of two chrome-molybdenum three-in. members tapering toward the front, and united by a two-in. tubular cruciform and two straight cross

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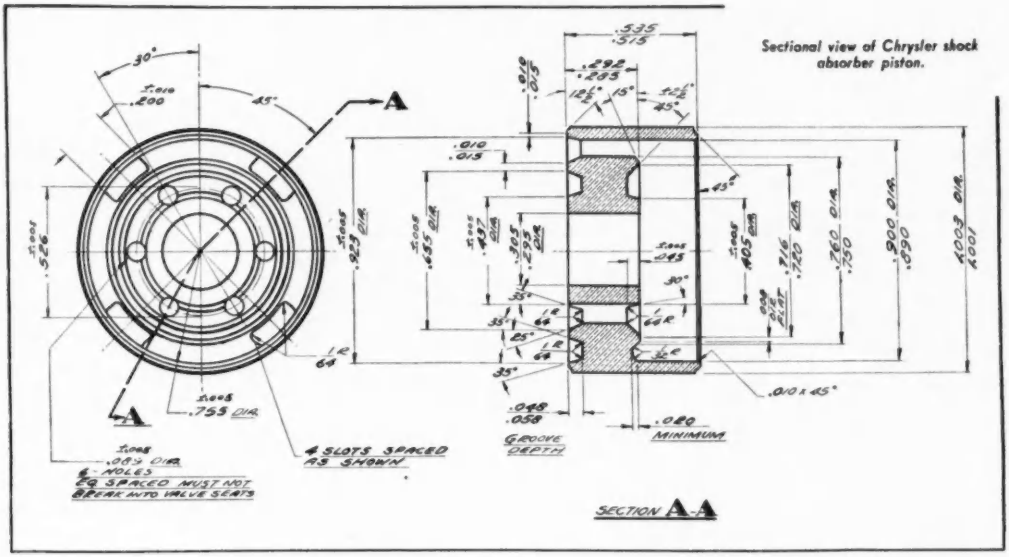

Sectional view of Chrysler shock absorber piston.

The Increasing Uses of
Powdered Metal Parts

By Joseph Geschelin

ALTHOUGH powder metallurgy is familiar to most designers and production men, the fact is that its immediate possibilities and cost economy have not yet been exploited to the fullest extent in the automotive industries. One of the major producers in this field, Amplex Manufacturing Co., a division of Chrysler Corp., is carrying on a continuous research program having two phases—studies of current commercial problems; and fundamental research in the field of new materials, new techniques, and an extension of useful applications in the future.

According to A. J. Langhammer, Amplex president, the company is specializing in Oilite parts of oil cushion type exclusively and has carried its development in two directions. On the one hand are the well known Oilite bearings of every conceivable type. However, the most impressive field of usefulness appears to be in the field of machined parts, the substitution of powder metallurgy for parts made by other means such as die castings, sand castings, and screw machine parts.

Although Amplex supplies more than 229 bearings

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Some of the Oilite bearings and finished parts used on Chrysler products: 1—Clutch pilot bearing, 2—transmission thrust washer, 3—steering gear bearing, 4—water pump bearing, 5—transmission thrust washer, 6—shock absorber rod guide, 7—window regulator gear, 8—water pump thrust washer, 9—oil pump "L" rose gear set, 10—gasoline filter, 11—axle bearing.

Hot-

Knee-type milling machine used for slab milling tests. Preheating the workpiece is done with an Airco flat surface torch, while the cutter and spindle are shielded by an asbestos plate.

THE machining requirements of high-strength engineering materials together with large volume demands have stimulated the development of better tool materials, machine tools and production processes. The metal cutting operation is still most widely employed when large production and high accuracy are required. Since the strength properties of high-strength alloys usually decrease at higher temperatures, machining of heated workpieces has been resorted to in order to benefit from the reduced hardness and tensile strength, which of course make machining much easier.

Since basically, the machine tool is the inverse of a heat engine and is supplied with mechanical work which is converted into an equivalent amount of heat in the tool, chips, and workpiece, the less heat the machine tool is required to produce, the easier the metal cutting operation becomes. (1)*

There are four different ways to machine heated workpieces:

1. Preheating the workpiece in the furnace and then machining it, meanwhile insulating or cooling the holding device so that not too much of the heat is transferred into the machine tool.

2. Machining workpieces while they are still hot from other manufacturing processes, for example, steel billets in a rolling mill*a and forgings or castings*b before they have cooled to room temperature.

3. Heating the workpieces on the machine tool either by induction or with gas immediately before the cutting operation. Lathe tests of this kind at work temperatures of 500, 1000, and 1500 deg F have been reported by Sam Tour and L. S. Fletcher. These workpiece temperatures were obtained by gas and induction heating (2).

4. Surface heating the workpiece on the machine for milling plane surfaces. In this operation the heat is applied to the top layer of the material and the machined surface is thus relatively unaffected by the heat.

When machining high-strength alloys at room temperatures more power is required in comparison to a similar cut in material of better machining properties. This means that the tool will reach high temperatures much more quickly and thus fail sooner when milling high-strength alloys. Fig. 1 illustrates how the hardness of the tool material will be affected by temperature. Even when machining a steel workpiece of about 200 Bhn the carbide tool will reach a temperature of 1500 deg F after a few seconds of cutting at 500 fpm (3). With increased cutting speeds on harder and stronger workpiece materials the tool will attain more quickly those temperatures at which its hardness will be lost and will no longer perform satisfactorily.

*Number in parentheses refer to bibliography at the end of paper.
*a U. S. Patent No. 2,387,553.
*b Proposed by H. F. Scoble of *American Foundryman*.

Milling Possibilities

By A. O. Schmidt and J. R. Roubik
Kearney & Trecker Corp.

There are two ways of avoiding high tool temperatures which cause a critical loss of hardness and cutting effectiveness. One method is to attempt to keep the tool temperatures sufficiently low with coolants and the other is to reduce the cutting resistance of the workpiece.

When cutting fluids having good cooling qualities can be properly applied, they will usually increase the life of high-speed steel and cast alloy cutters by about 100 per cent. Improvement in the life of carbide tools when the tool and workpiece can be completely flooded with an emulsion have been experienced.

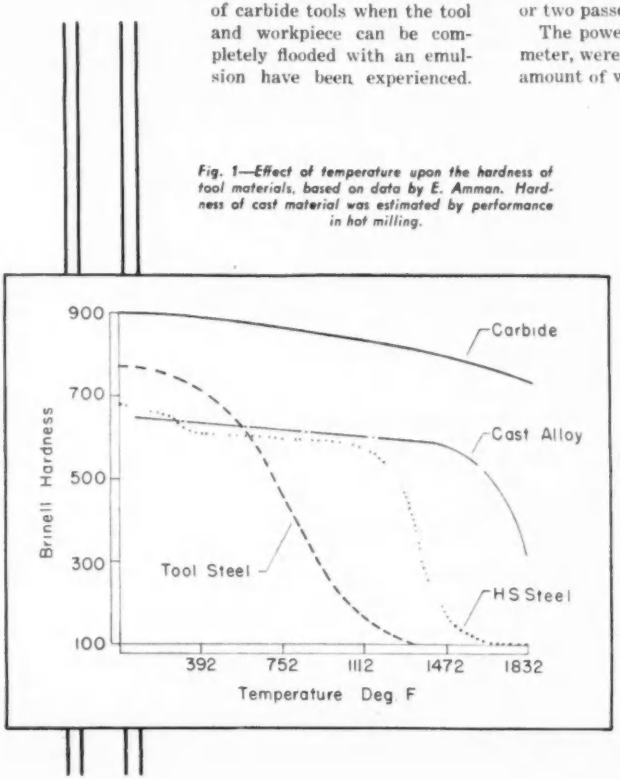


Fig. 1—Effect of temperature upon the hardness of tool materials, based on data by E. Amman. Hardness of cast material was estimated by performance in hot milling.

Coolants, however, cannot be expected to solve all difficult milling problems; different approaches to such problems sometimes have encouraging results. For example, when a number of old die blocks used in drop forging required resurfacing, the cutting speed for the carbide milling cutter had to be reduced to about 100 fpm and the feed to 0.0035 in. per tooth. Only thus was it possible to obtain a satisfactory tool life of 12 passes, 24 in. long, six in. wide, and 0.250 in. deep with a 10-in. diam carbide face mill. At higher speeds and feeds the cutter failed quite frequently after only one or two passes.

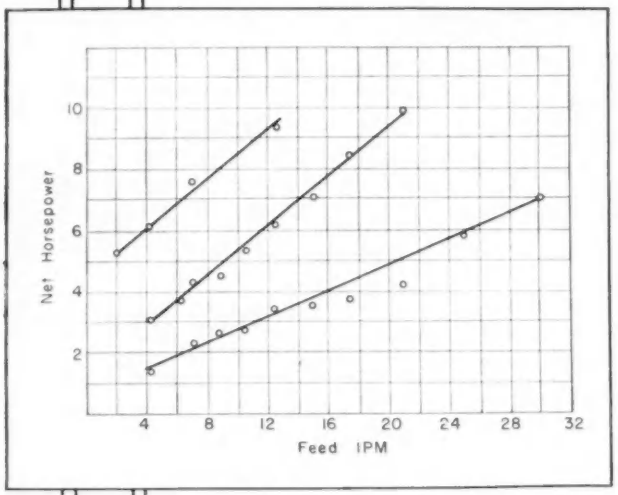
The power requirements, as measured with a wattmeter, were very high. Another indication of the large amount of work required in this particular milling job was the high temperature of the chips, which would reach 1400 deg F, as determined by comparison of the chip with a heat-color chart.

In further machining tests the first method of hot machining was employed. One of the die blocks was heated in a furnace to 1800 deg F and then mounted in an insulated fixture on the milling machine table.

The milling of this heated die block started when the block was at about 1500 deg F, as determined by comparison with a heat-color chart, and the temperature continued to drop slowly as the tests proceeded. The power required, measured with a wattmeter, is plotted as the lower line in Fig. 2. After the block had cooled to room temperature its hardness on the surface had dropped from an average of 400 Bhn to 350 Bhn, which also reduced the power needed as indicated by the middle line in Fig. 2. When the block was at room temperature in its original state, the power consumption was as shown by the upper line (4).

Because of the intermittent cutter-

Fig. 2—Power required in milling a die block. The upper line indicates power to mill the block in "as received" condition. The lower line shows power requirements when the block was heated to about 1500 deg F. The center line indicates power requirements for milling the block after it had cooled again to room temperature.



workpiece contact inherent in milling, tool life is comparatively good when machining a heated workpiece, since the tooth is not in continuous contact with the work and has some chance to cool in the air between cuts. Changes in microstructure and accuracy in the workpiece are unavoidable when the entire workpiece has been preheated in a furnace but a difficult milling job can be made easier this way. Care should be taken to provide proper protection against the heat flow from the workpiece into the machine, either by insulating with layers of asbestos or by circulating a coolant in the table or fixture.

Preheating the workpiece means that the cutter will not be required to produce as much heat in cutting as when the workpiece is at room temperature. Instead of heating the chip material from room temperature to about 1400 deg F by deformation, compression, and friction attendant to normal cutting action, preheating the die block to the specified temperature will require a much smaller percentage of additional heat during the chip formation.

In tool-life tests on cutters with carbide tips, the same number of passes were completed when milling heated workpieces at high feed rates as when milling the same workpieces at room temperature at only one-eighth the feed rate.

A large number of slab milling tests using the fourth method listed before, were conducted on a Kearney & Trecker 1808 CSM bed type Simplex machine, as well as on a knee-type milling machine. The cutter used was a Goddard & Goddard slab milling cutter five in. diam by four in. wide with eight teeth tipped with Tantung. The workpiece was a flat steel plate of SAE 4340, 280 Bhn, with the surface preheated by a 3½ in. wide Airco water-cooled flat-surface torch (see Fig. 3). Pieces of asbestos board were used for insulation and for shielding the cutter and spindle nose. Before the table feed was engaged, the torch was lighted and the flame adjusted while the spindle was running. Feeds used in these tests were 50 and 60 ipm with a spindle speed of 180 rpm equivalent to 236 fpm cutting speed (5).

When milling plates of SAE 4340, ¾ in. wide and 24 in. long, about 60 pieces could be made with a H.S.S. cutter, 0.200 in. depth of cut, at a cutting speed of 90 fpm, and a feed

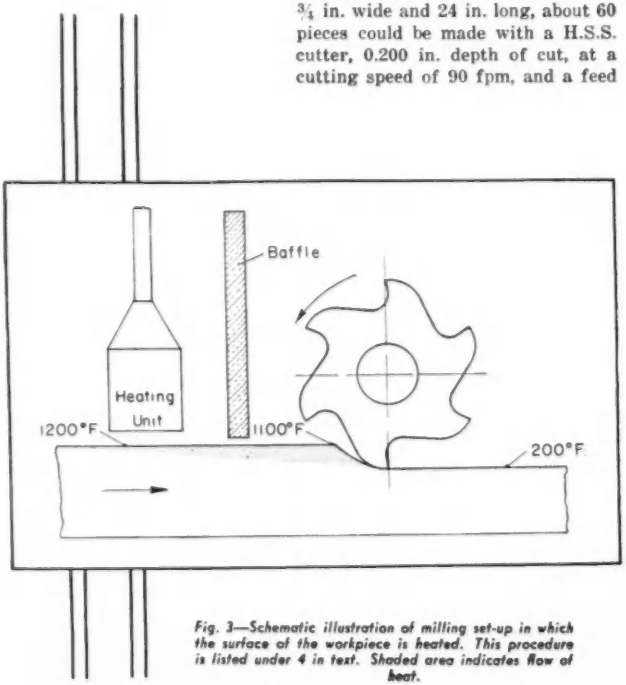


Fig. 3—Schematic illustration of milling set-up in which the surface of the workpiece is heated. This procedure is listed under 4 in text. Shaded area indicates flow of heat.

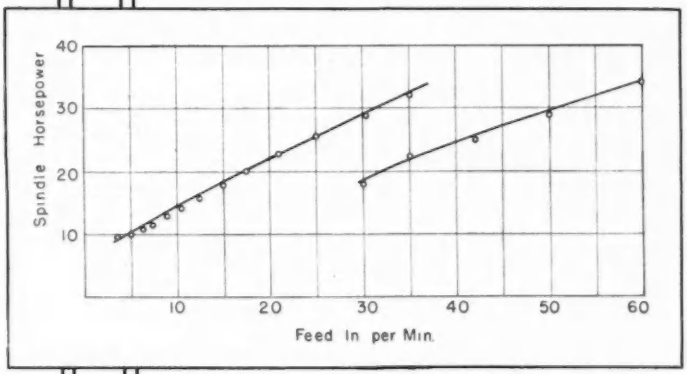


Fig. 4—Spindle horsepower in relation to feed of Kearney & Trecker milling machine described in text. The lower line is for the preheated workpiece; the upper line is for the workpiece milled at room temperature. Depth of cut, 0.200 in.

of 6 ipm, flooding cutter and workpiece with an emulsion. When these same pieces were cut by flame from a larger plate, the flame cut surface would air harden to such a degree that not even a cutter with cast alloy teeth could complete one pass. Using a single torch for preheating this surface, this machining operation was performed at feeds of 53 ipm and one section of the cutter would complete as many as 90 passes at a depth of cut of 0.200 in.

The heat supplied by the torch was sufficient to heat the surface of the workpiece in each case to around 1200 deg F. This softened the top layer of the material and cushioned the shock when the milling cutter tooth entered the work. The temperature of the work surface at the point of engagement with the cutter, several inches away from the torch, was about 1100 deg F, see Fig. 3. In addition, the power requirements were reduced as can be seen in the graphs, Figs. 4 and 5.

There was no discoloration or temper color on the milled surface, indicating that temperatures in the workpiece were below 350 deg F during the cut. A microscopic examination revealed no difference between the microstructure of a piece machined at room temperature and one machined with a preheated surface.

These numerous tests conducted with the workpieces heated on the milling machine with an oxyacetylene torch indicate that, because of reduced power consumption, milling is possible at greatly increased feeds. Higher production would justify the additional expense incurred in preheating the workpiece.

When applying heat on the top surface of the workpiece, it was possible to control the heating in such a way that the impact blow between the cutter and work was reduced, the horsepower consumption lowered, and the rate of feed increased so that practically all of the heated material was cut out or removed in the form of chips. The workpiece and cutter were not too warm to be touched by hand immediately after the cut and no noticeable distortion of the workpiece could be detected.

As can be seen in Fig. 1, sintered carbide remains comparatively hard at high temperatures and will therefore mill a heated workpiece under conditions that will cause a high speed steel cutter to fail almost immediately. Many tests were also run with cutters having teeth of cast material. Judging by the good performance of cast materials, their hardness when milling a heated steel piece will approximate the line indicated in Fig. 1. Cast alloys prove to be satisfactory tool materials for use in hot milling, while H.S.S. cutters fail very quickly in such an operation.

Heating a steel workpiece will decrease the power requirements appreciably. Combined with intermittent cutting, an inherent characteristic of milling that results in tooth-workpiece contact for only a part of a cutter revolution, this practice yields good tool life. Carbides and cast alloys are suitable tool materials

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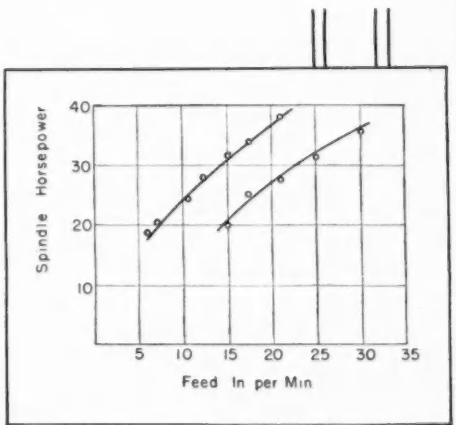

Fig. 5—Spindle horsepower in relation to feed of Kearney & Trecker milling machine described in text. The lower line is for the preheated workpiece; the upper line covers the workpiece at room temperature. Depth of cut, 0.380 in.

M.A.N.

By P. M. Heldt

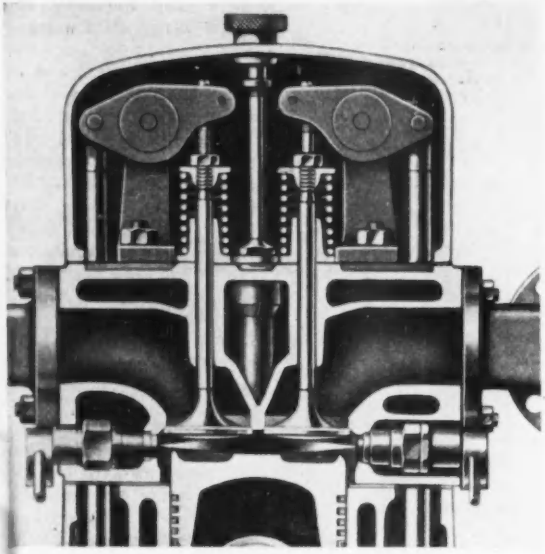

Fig. 1—Combustion chamber arrangement adopted in 1923 by M. A. N. for its Diesel truck and bus engines.

THE Maschinenfabrik Augsburg-Nuernberg, A.G., the German firm which built the first Diesel engine, has issued a pamphlet to commemorate the 25th anniversary of its entrance into the Diesel-truck field. The publication contains some interesting historical notes relating to the early development of the Diesel engine, as well as an account of the various stages through which the M.A.N. high-speed or automotive-type Diesel engine has passed. The first M.A.N. Diesel-engined truck was exhibited at the Berlin automobile show in December, 1924.

The Augsburg Machine Works already was more than 50 years old in 1892 when the engineer Rudolf Diesel approached it with a proposition to undertake the construction of a new type of heat engine of his invention. At first the management regarded the project somewhat skeptically, but on Feb. 21, 1893, a contract was concluded with Diesel in which the Augsburg Works agreed to build an experimental engine. Some two months later Diesel concluded a similar contract with the firm of Friedrich Krupp in Essen, and shortly thereafter the two firms agreed to share the cost of construction of the experimental engine, which was to be built at Augsburg. After three years of experimental work it became evident that, although the engine had been rebuilt several times, it was impossible to obtain satisfactory results with it, and Diesel's numerous opponents seemed to have confirmed their doubts as to the practicability of his ideas. The Augsburg Works, however, decided to build another engine in which, in addition to some new ideas, all of the lessons of previous experience were incorporated. This engine, which now reposes in the German Museum in Munich, after a few trial runs ran so satisfactorily that Prof. Schroeter of Munich Technical College could begin the official acceptance tests in mid-February, 1897. These tests proved that the new Diesel "rational heat engine" not only was operable, but had a thermal efficiency that far exceeded that of the steam engine and other prime movers.

While M.A.N. built its first Diesel motor truck in 1924, the idea of applying the Diesel engine to road vehicles dates back much farther. In fact, the Augsburg Works built a two-cylinder, double-piston engine with air-injection in 1898, and Diesel referred to it optimistically as the Nuernberg automobile engine.

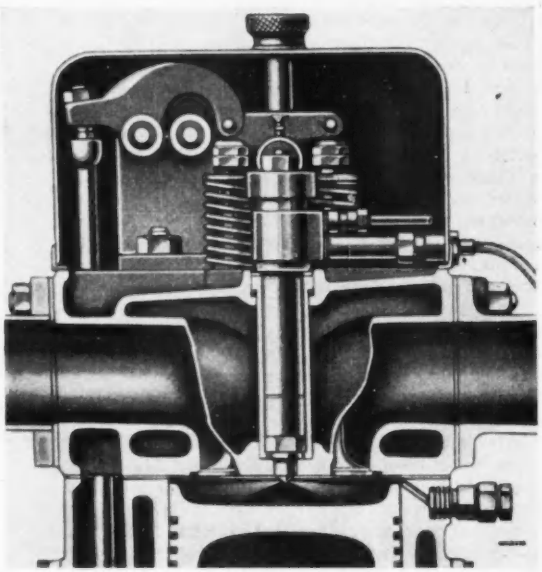

Fig. 2—In 1927 M. A. N. changed to this combustion chamber design with a single nozzle.

Diesel Development

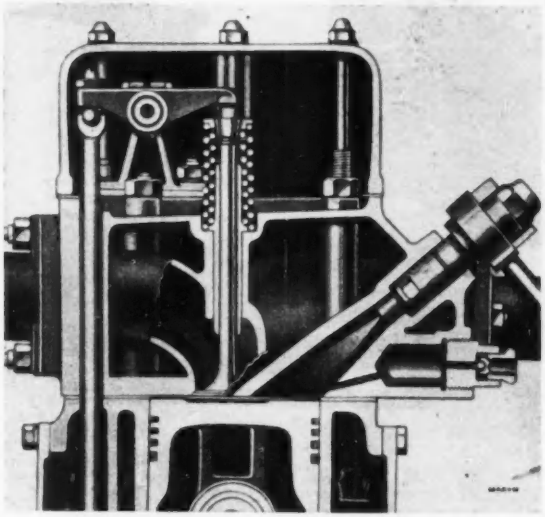

Fig. 3—M. A. N. Diesel conical combustion head and air chamber combination in 1932.

Latest Design Has Spherical Combustion Chamber in Piston

precombustion-chamber engine, in which the pressure generated by partial combustion in a chamber into which the fuel is injected mechanically, serves to distribute the charge in the main combustion chamber. Experiments with this single-cylinder engine showed the advantages of the undivided combustion chamber, and in 1922 work was begun on a four-cylinder engine suitable for installation in a truck. The crankcase and crank train of a stock carburetor engine were used. The engine developed 40 hp at 900 rpm and was built into a truck chassis.

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These hopes, however, faded rapidly. All other attempts to build Diesel engines with air injection for automotive purposes were doomed to failure, as it proved impossible to build the necessary compressor for the required higher speeds and the widely varying load. In addition, the complicated air pipe lines, and the greater bulk and weight were undesirable. Thus the four-cylinder vehicle engine with air injection which Diesel had built in Switzerland in 1910 had no lasting success. It never gave satisfactory service, and today it, too, reposes in the German Museum.

M.A.N. began development of a Diesel engine for automotive purposes in 1920, building a single-cylinder experimental engine. It had long been recognized that air injection was unsuitable for engines of this type, and others in the meantime had developed the

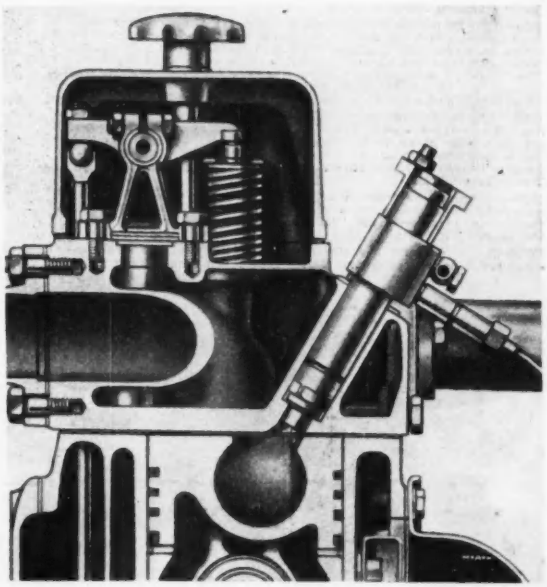
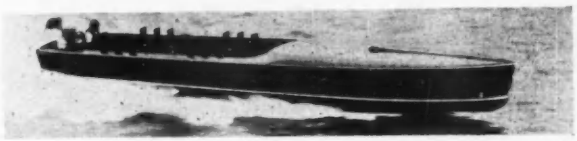


Fig. 4—Latest design of combustion chamber in use on M. A. N. Diesels.

A Half

1949 — Golden Anniversary Packards ready for mass drive-away and the Packard plant in Detroit today.



Gar Wood, with two 1100 hp Packard engines in his Miss America VII, won the Harmsworth race in 1928 and established a world's speed record on water of 92.8 mph. With similar equipment in 1931 he raised the record to 102.256 mph. Gar Wood's Miss America X, shown here, won the 1932 Harmsworth race and established a new world record of 124.86 mph. This craft was powered by four Packard engines developing a total of 6400 hp.

1899—On Nov. 6, 1899 this first Packard horseless carriage caused quite a stir as it chugged along the quiet streets of Warren, Ohio. This single-seated buggy type car, running on wire wheels, was steered by a tiller and equipped with a three-speed-forward and one-speed-reverse transmission. It was chain driven and powered by a one cylinder horizontal engine developing 12 hp. The ignition system had an automatic spark advance not common in other cars until later years. This model A, sold on Jan. 3, 1900 for $1,250, is now preserved at the James Ward Packard Laboratory at Lehigh University.

1904—Model L, the first car built at the Detroit plant in 1904, presented a radical departure in appearance over all other Packards which had been produced up to that time. Note the traditional Packard radiator lines.

1910—This luxurious 1910 limousine had a dry plate clutch, cellular radiator, and an automatic latch which held the starting crank in a vertical position. Shock absorbers and headlights, previously regarded as accessories, became standard equipment. The "Thirty" was powered by a four cylinder engine that developed 30 hp at 650 rpm while its smaller counterpart the "Eighteen" had an engine that developed 18 hp at 650 rpm.

1915—This model was powered with the famous Packard Twin-Six. The engine was of the V-type with 12 cylinders arranged six on a side at an included angle of 60 deg. It was probably the first production car to use aluminum pistons. Packard production soared to 10,000 cars in 1916 due to the popularity of the Twin-Six engine.

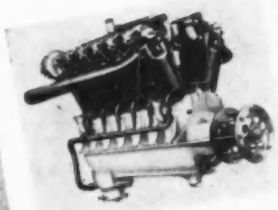
1920—At this time there was a demand for a smaller, lighter automobile than the Twin-Six. Packard, following the trend of the times, produced this "116 Single-Six" as a companion to the larger Twin-Six.

1930—Compared with the closed car of 1910, this 1930 straight-eight sedan is a sleek automobile. This model employed a four-speed transmission, a new carburetor, and a double fan belt drive. Note the belt molding terminating in an arrowhead at the front of the hood.

1940—In front-end styling and in eye-appeal generally, Packard accented the modern trend of 1940 without departing from its characteristic lines. Front-end appearance was changed by the introduction of a narrower front grille, supplemented by two side grilles. The radiator shell had more rounded lines, relieving the customary sharp edges with a gracefully rounded nose molding into the narrow grille. Insulation against heat and sound was incorporated in the bodies at the roof, panels, doors, cowl, floor, and trunk.

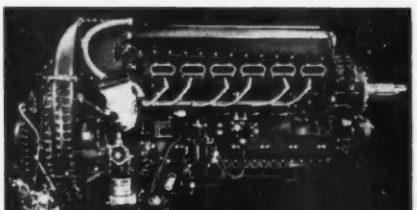
WORLD WAR I—General Peyton C. March, World War I Army Chief of Staff, wrote "The real contribution of America to the development of aviation during the war was the Liberty engine." The plans of the engine were essentially the Packard 900 with modifications brought about due to the war. Of the 13,574 engines manufactured, Packard made 6500 or more than any other company involved in the program.

WORLD WAR II—Packard's long experience with high-powered engines enabled the company to accept the World War II assignment for the mass production of the Rolls-Royce Merlin aircraft engine. Over 55,000 of these engines were manufactured by Packard for the U. S. and ally nations. The "Betty Jo," a twin-Mustang powered by two Packard-built Rolls-Royce engines, made a record non-stop flight from Honolulu to New York City on February 28, 1947.



WORLD WAR I

WORLD WAR II



Century of
Packard Progress

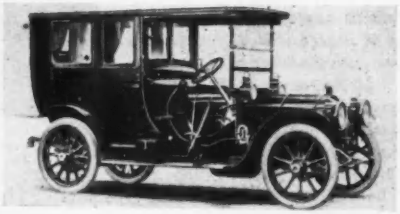
THE Packard Motor Car Co., America's oldest continuous maker of passenger cars under a single management, celebrates its golden anniversary this month. On Nov. 6, 1899, the first Packard was completed in a shed at Warren, Ohio. Since that time, in addition to an unbroken line of passenger cars, many types of aircraft engines as well as marine engines in various sizes have been produced in the Packard plant. Today a line of passenger cars, powered by eight cyl engines of 135, 150, and 160 hp, is being built at the mile-long factory in Detroit.

In addition to automobiles, Packard is producing three marine engines and a hydraulically controlled reverse gear for boats. The firm is also doing research for the U. S. Navy on PT boat high-powered engines.

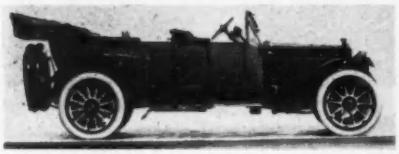
1899

1904

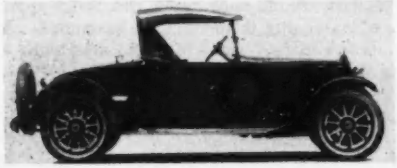
1910



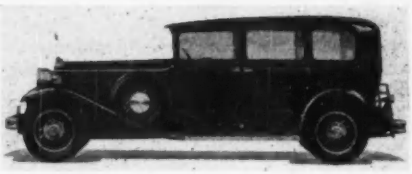
1915



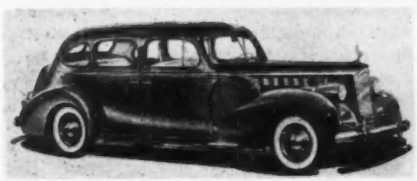
1920

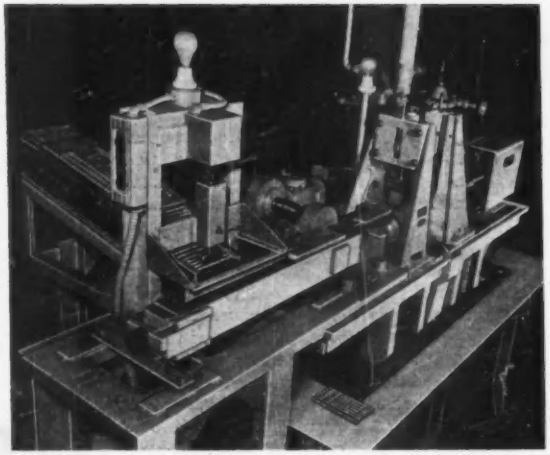


1930



1940

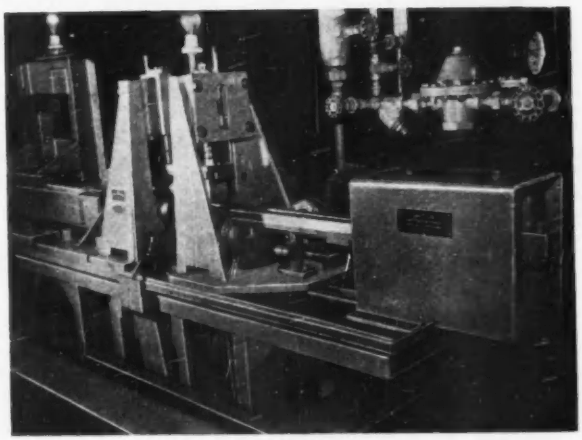




Selective

By Joseph Geschelin

Close-up of left side of induction hardening machine, showing the magazine and power driven conveyor.



Close-up of right hand side of the machine. At the left is the inductor block and quench; at the right is the out-feed of the trough where hardened work is ejected.

CONSIDERING the constant advances being made in the field of induction heating and hardening, it is of interest to find an application having unusual features of design and operation currently in use at the Dodge Div., Chrysler Corp. Using a specially designed r-f induction hardening machine, Dodge is selectively hardening gearshift rails in a continuous and automatic cycle at the rate of 400 pieces an hour in each of two units. The machine features a new type horizontal rotating scanner, operates on a frequency of 450,000 cycles, and is served by a 10 kw oscillator.

From the standpoint of overall cost economy this automatic induction hardening process marks an important gain over the former method of batch hardening in the several stages of carburizing and selective cyanide hardening of both ends. Equally as important in mass production is the conservation of floor space, reduction in equipment required for the operation, the gain in quality, and the practical elimination of rejects. The induction hardening machines are placed directly in the machine shop, thus eliminating the handling previously required in moving parts from the machine shop to the heat treating department and then back to the machine shop and assembly line.

One of the principal requirements incident to the design of this equipment was the ability to handle four different types of shifter rails on each of the two machines. The illustration of the gearshift rails showing sections of the four parts, provides a good picture of the differences in length and areas to be hardened. These sections also indicate the pattern of hardening. Actually, the critical hardened sections are specified around each ramp and ramp approach. Depth of hardening is about $\frac{1}{8}$ in. maximum. All of the rails are made from AISI 1045 steel with hardness in the range of Rc 60.

Two close-up views of one of the machines are reproduced to permit visualization of some of the principal design features. As an over simplification, it may be said that the machine consists of three major components—the automatic loading device, the horizontal rotating scanner, and the industrial r-f generator. It hardens shafts by passing them continuously through an inductor coil and adjacent water spray quench ring. Uniformity of case depth is obtained by means of precisely controlled feed while concentricity of the case is assured by positive guiding and rotation of work about its longitudinal axis.

The closeup of the left side of the machine shows the detail of the automatic work loading device. In

Hardening *of Gear Shift Rails in* Automatic Machine

the background is seen the magazine for feeding rails into the conveyor. Each machine is provided with four magazine rails so designed as to fit a specific shift rail with the proper end always in the lead. The only set-up change required to change over from one rail to another is to exchange magazines.

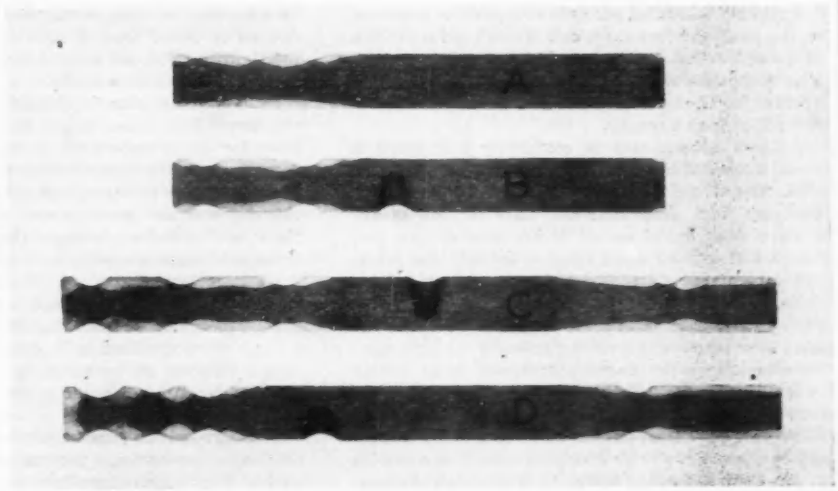
Gearshift rails drop onto the special power driven chain conveyor, one by one. As the rail drops onto the conveyor it is picked up and held accurately in a cam-actuated block, the sequence of movement of the blocks being so arranged as to assure end-to-end contact of work. The most important feature of the operation of the scanner is the continuous through feed of work on the conveyor without even minute interruptions of movement.

The horizontal rotating scanner is designed to feed the work at a controlled rate of speed through the inductor block and spray quench. A group of three rollers in the headstock serves to rotate the work and cause forward motion at the same time. A similar group of rollers in the tailstock picks up the rails before they are free of the headstock and draws them through the inductor.

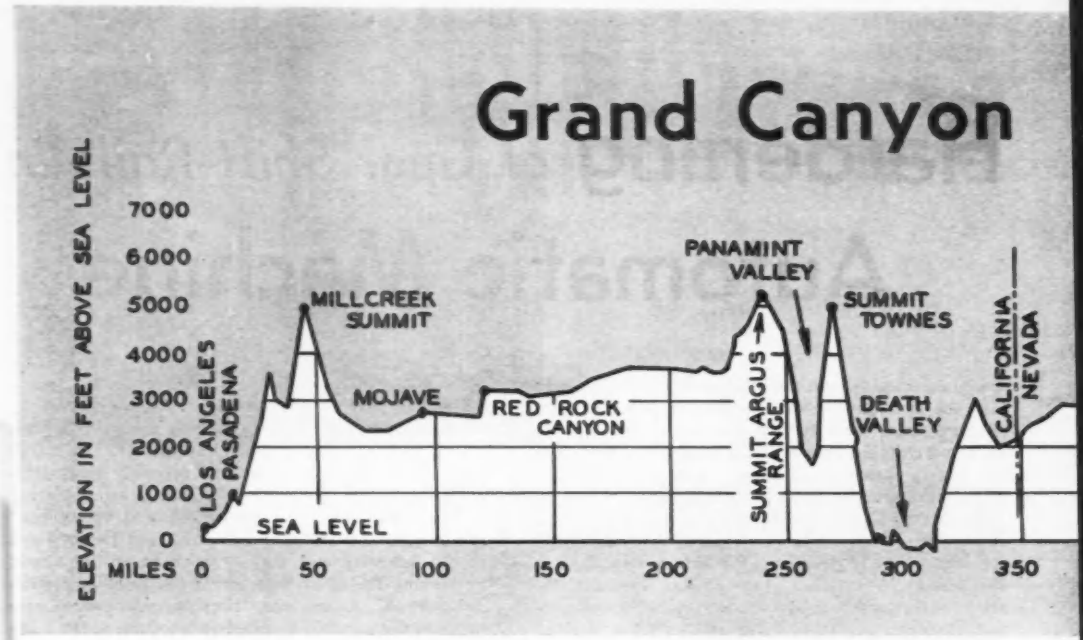
Selective hardening in a progressive system described here requires that r-f power be turned on and off at precisely timed intervals. This is effected by electronic "keying" of r-f power by means of a limit switch at the end of the out-feed trough. As a rail leaves the scanner it trips a microswitch which triggers the control of the rectifier grid circuit. Timing of the entire cycle is so arranged that "power on" will harden the tail end of one rail and forward end of the following rail, the interruption of the circuit permitting the other portions of the work to remain unhardened. At the same time the microswitch also actuates the solenoid-operated gate release at the automatic loader, thus permitting another rail to enter the conveyor.

We mentioned earlier that each machine has four different magazine rails to accommodate the four different types of shift rails. Although each rail requires a different magazine, the two short rails have a hardening pattern so nearly alike as to permit the use of the same timing cycle; consequently, the control cabinet requires only three timers. Each magazine is provided with a cable lead terminating in a special plug. As the magazine is installed on the machine, the

(Turn to page 67, please)



Sections of the four different shifter rails processed in the new horizontal rotating scanner type induction hardening machine. A—high and low speed rail; B—reverse rail; C—low and reverse rail; D—second and direct rail.



REVIVED for the first time since the war, the Grand Canyon Economy Run will be held from Los Angeles, Calif., to Grand Canyon, Feb. 15-16, 1950. Under the sponsorship of the General Petroleum Corp., and sanctioned by the American Automobile Association Contest Board, the 751-mi run will test the economy of 21 individual makes of American automobiles. It is expected that 50 or more automobiles will compete, and the cars participating will be divided into ten price divisions.

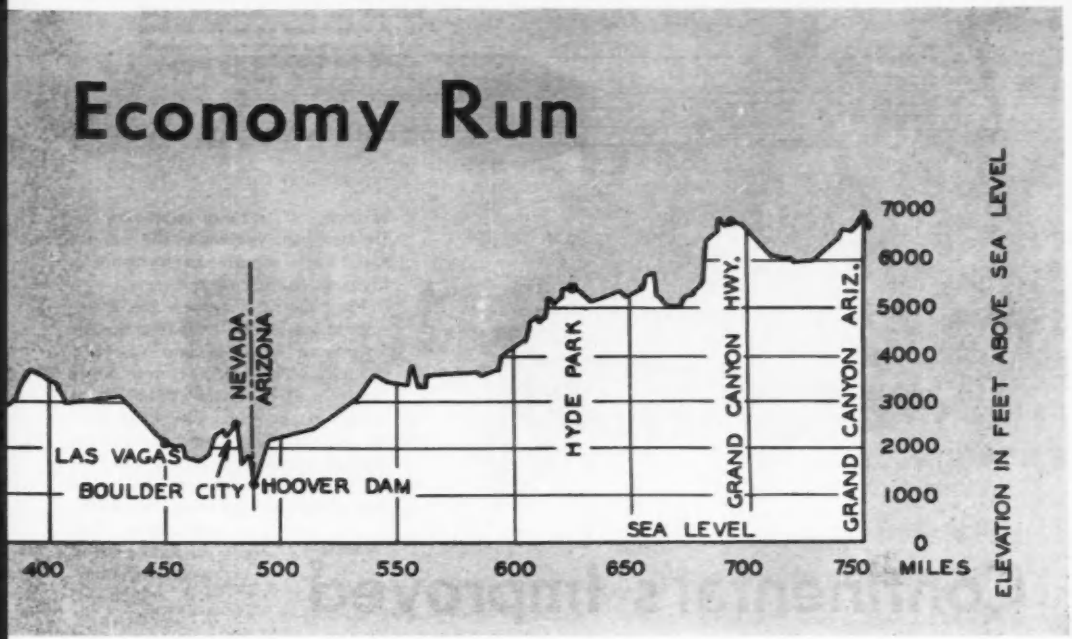
Based on "ton-miles per gallon of gasoline consumed on the run," the first three cars in each price division in the order of their ratings will be awarded a trophy. The automobile with the greatest ton-mile per gallon average for all cars will be the Sweepstakes Champion, and will receive a trophy.

All cars entered will be completely dismantled to check stock status before they are allowed to participate. The official rules of the Mobilgas Grand Canyon Economy Run state that eligibility is open to any stock current model car of U.S.A. manufacture and design with a front wheel tread of not less than 54 in. The car entered must be a 1950 four-door metal top sedan model (four-cyl special class excepted) not driven more than 5000 total vehicle miles. The car must be catalogued, advertised and sold through regular channels by the manufacturer, and must comply to the specifications of the model as furnished by the motor car manufacturer on or before Monday, Jan. 16, 1950. Not more than one car made by a manufacturer can be entered in a price division unless, in the opinion of the Contest Board, American Automobile Association officials, additional entries are needed to complete the competitive requirements of any particular price division. A car may be entered by a manufacturer, a motor car dealer, or a private owner.

No entry fee to be charged, but an entry blank must be completely filled out, in triplicate, and complete data given on every question set forth. Entries must be received by A. C. Pillsbury, American Automobile Association Regional Director, 1049 Selby Ave., Los Angeles, or bear the postmark not later than noon, Monday, Jan. 16, 1950. Owing to the limited accommodations at Grand Canyon, officials of the Run reserve the right to reject any entries received after the quota for the Run has been filled.

Price division classification of each car entered in the Run will be based on the factory retail delivered price for the lowest-priced standard four-door sedan of each model classification, plus Federal excise tax, cost of standard equipment, conditioning and handling charges, and also plus the cost of the following optional mechanical equipment: Overdrive, underdrive, four-speed transmission, torque converter, fluid drive, automatic transmission, or two-speed rear axle. A deluxe model may be used, but in no way does its use change the Price Division Classification. In order for a car to be considered as a different model, it must have a different engine and/or a different wheel base. No four-cyl car may enter other than price division "A."

Each car finishing the regulation run will have its economical performance determined as follows: Gross vehicle weight including allowable load, in tons, times



the official run mileage (which is the "ton-mile total"), divided by the number of gallons of gasoline consumed (which product is the "ton-miles per gallon"). At all legal Arterial Stops, the car must come to a complete stop. In computing awards, AAA Contest Board officials will deduct five ton-miles from the "ton-mile total" for each Arterial Stop violation. These deductions will be made before the "ton-mile total" is divided by the amount of gasoline consumed. However, if a driver inadvertently fails to make an Arterial Stop, he may correct the violation by bringing his car to a complete stop at the first opportunity.

Each car is to carry at all times during the contest full and complete equipment as advertised and catalogued by the manufacturer as complete with the car. (Spare tire and tube necessary.) Only certain optional stock parts can be used. No changes or alterations of any nature will be permitted, except grinding of valves, and adjustment of moving parts to clearances or settings as specified by the car manufacturers.

Carburetor jets or metering rods may be changed to the first lean range as catalogued by the car manufacturer as stock. No drilling, soldering, filing or alterations of any nature may be made to the carburetor jets or metering rods that will change their flow characteristic. No alterations or changes in venturi tubes will be allowed.

The only stock accessories allowed are as follows: Oil filter, air cleaner—oil bath type, windshield washer, clock, radio—no rear seat speaker, heater, defroster and/or air conditioner, two fog lights, back-up light, rear window wiper, one outside mirror (left), wheel rings or disks, radator covering, and bumper guards (no contestant will be given an allowable weight in excess of 25 lb for accessory bumper or grille guards).

No car will be permitted to have an overdrive or a four-speed transmission with underdrive, torque converter, fluid drive or automatic transmission in conjunction with a two-speed rear axle. This is to be rechecked, and perhaps expanded. No changes in manufacturer's specifications of either optional or standard parts, accessories or equipment made after Monday, Jan. 16, 1950, will be recognized by the Contest Board, American Automobile Association.

In order to facilitate that part of the official inspection that involves checking of engine, transmission and differential, and to eliminate the necessity of returning the car to the Los Angeles Impounding Area after the completion of the Run, entrants must arrange with A. C. Pillsbury to have this inspection completed at their respective shops prior to Monday, Jan. 16, 1950.

Only tires and tubes, both front, rear, and spare regularly catalogued for the make and model entered as standard equipment, may be used. No optional tires, wheels, or rims may be substituted. During impound period, all tires will be completely deflated by AAA Contest Board officials and refilled with bottled standard air. If requested, wheels and tires will be balanced by AAA Contest Board officials to the entrant's satisfaction. Immediately prior to starting, each tire will be pressurized according to a predetermined scale. This scale will be computed by averaging the pressures for that tire as recommended by the car manufacturer,

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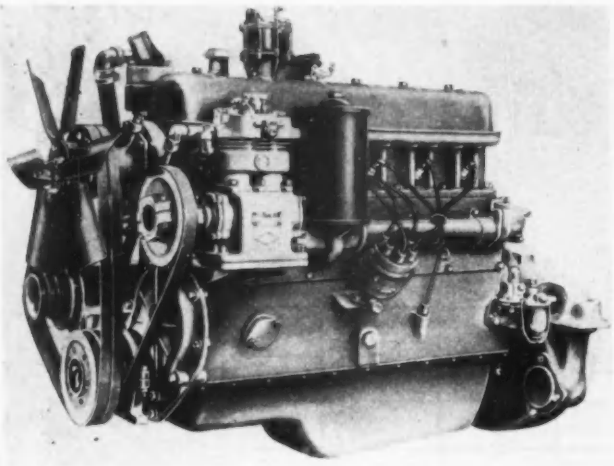

Left side view of the Continental T-6427 six-cyl, valve-in-head engine. The oil filter and oil cooler are standard equipment; the air compressor is supplied only when specified.

Continental's Improved Truck Engines

AN improved version of T-600 Series six-cylinder, valve-in-head engines groomed by Continental Motors Corp., for new truck models features a redesigned cylinder head, improved individual porting in the intake manifold, sodium-cooled exhaust valves with rotators, and refinements in the exhaust and cooling systems. With these improvements, the two basic engines in the line are said to give superior performance in highway hauling service.

The illustrations show the accessory arrangement, including the air compressor which is supplied when specified. The left side view shows the replaceable element filter behind the air compressor. The water inlet passage to the cylinder block runs through the filter mounting base and the large water delivery pipe to the rear of the filter contains the tubular oil cooler. The oil filter and cooler are standard equipment. Provision is made for front or rear location of fuel pump, and an angular distributor drive is provided at the engine centerline. Starter location is provided symmetrically on both sides of the engine.

The right side view shows the manifold arrangement. The individually ported intake manifold is designed for 1¾ and 2-in. carburetors. The high-alloy exhaust manifold of chromemoly iron for hot strength and minimum distortion and growth is made in two short pieces with two expansion joints to allow for growth under operating temperatures. The belt driven generator and right hand mounted starter also are shown.

The new cylinder head is a one-piece electric furnace chrome-nickel alloy iron casting in which combustion chamber form and spark plug location have been coordinated to give excellent detonation control. Plugs are located on the side opposite the manifold for accessibility and

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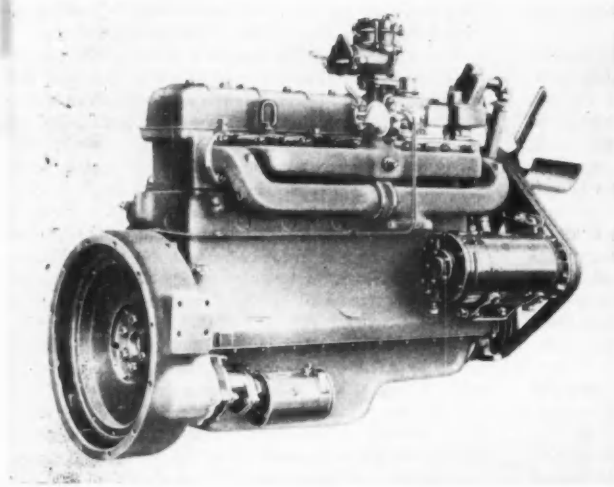


Right side view of the Continental T-6427 engine. Provision is made for mounting the starter on either the right or left side of the flywheel housing. Note the hot spot arrangement with joints to permit expansion of the exhaust manifold.

Features of the Ford Mercury

By Leonard Westrate

Automatic Transmission

New Unit Developed by Ford and Borg-Warner Combines Hydraulic Torque Converter and Three-Speed Planetary Gear Set

FORD and Mercury will be available with an automatic transmission as optional equipment at extra cost beginning about next July 1. The announcement, giving official confirmation to well founded reports, was made by Harold T. Youngren, Ford vice president-engineering, at a press conference in Dearborn early in October.

The transmission is a combination of a torque converter and a three speed planetary gear set, and was developed cooperatively by Ford engineers and Borg-Warner Corp. Both companies now are tooling for production of the unit, which will be built by Warner Gear Division, Muncie, Ind., and by Ford at a location not yet determined. Both Ford and Warner Gear will build complete units.

Price of the new transmission has not been finalized, but Mr. Youngren said it would be considerably under that of other fully automatic transmissions now on the market and probably would not be more than $150. He added that it has about 10 per cent fewer working parts than any fully automatic transmission now available. He said that the unit would not be used on the Lincoln, presently offered with Hydra-Matic, at the outset of production at least, but did not disclose any ultimate plans that may be in the works for Lincoln so far as automatic transmissions are concerned.

The mechanism consists of a torque converter having a multiplication factor of more than 2 to 1. Blade elements are formed in such a way as to give most efficient results when used as a fluid coupling. A reactor member goes out of action when acceleration is completed and the converter acts as a hydraulic drive. The gear box, hydraulically operated, includes two input sun gears, an output ring gear, and the required meshing pinions to form a three speed and reverse gear set, which is operated by two bands and two clutches. One clutch is constantly engaged during all forward motion.

The new transmission has the "kick-down" or passing gear feature common to most fully automatic transmissions. The down shift to intermediate gear is made by pressing down sharply on the accelerator pedal at speeds below 50 mph to give a gear ratio of 1½ to 1 for quick acceleration or hill climbing.

A unique feature of the new transmission is that under normal conditions, the car starts in the intermediate range, which has a ratio of 1½ to 1, assisted by the torque converter, to give starting torque of about 3 to 1 ratio, which is equivalent to normal low gear in a standard transmission. Consequently, there is only one automatic shift, from intermediate to high, at speeds of from 15 to 60 mph, depending upon throttle feed.

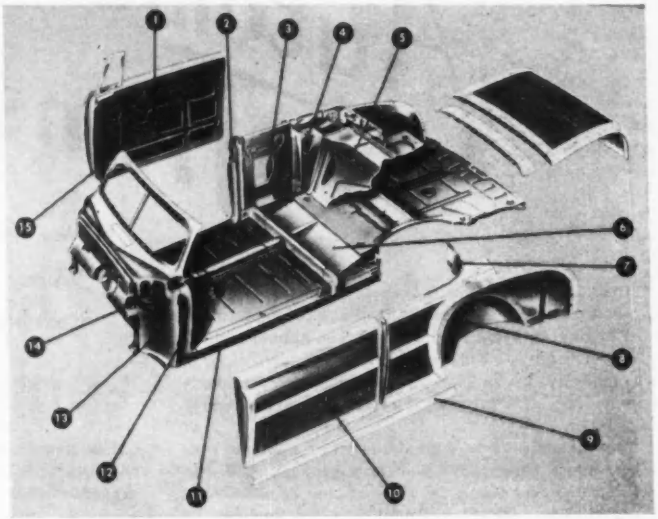
Another unusual feature of the transmission is its deceleration or braking characteristics. When the control lever is in low range, it not only automatically puts the car into low gear at speeds below 40 mph, but also provides intermediate gear braking at speeds higher than that, a useful feature on mountain or other long grades which can be negotiated safely at medium speed.

Still another characteristic different from current practice, is the completely new shifting arrangement. The reverse position on the control quadrant is to the left of neutral, obviating the need to go through forward gears to reach reverse and making it easier to rock the car in snow or mud. A parking brake of the full mechanical lock type also is included in the transmission.

(*Turn to page* 62, *please*)

Steel and Wood In Town and Country

Chrysler's New Model Employs White Ash for Trim and Framing With a Steel Basic Structure



Exploded view of the Town and Country body construction. (1) door inside panel, (2) lock pillar, (3) quarter panel, (4) quarter pillar, (5) shelf panel, (6) floor pan, (7) belt bar, (8) wheel-house panel, (9) white ash trim, (10) steel panel, (11) floor sill, (12) front pillar, (13) lower cowl panel, (14) dash panel, (15) door hinge pillar.

WITH the introduction of its new Town and Country model, Chrysler features a basic all-steel body structure in which steel elements are designed to carry the load while the white ash wooden parts are employed primarily for trim and framing.

The wood parts and subassemblies are precision machined and jointed at Chrysler's Pekin Wood, Ark., plant which also supplies wood parts for Chrysler station wagons. Subassemblies such as the framing for the trunk lid, rear quarter panel, and doors are assembled, by use of a phenolic resin, in special forms. These assemblies in their forms are placed in a 15-ton hydraulic press where they are held under pressure while heated by means of high frequency electric current having an average voltage of 3500. Glued joints are held under an average pressure of 145 psi with a temperature of 170 F for curing. Average time for this cycle is 2½ minutes.

From the presses, work goes to the bench where the assemblies are hand sanded to a fine finish. Next the parts are processed with a penetrating oil that seals the pores of the wood. The wood surfaces are then treated with a filler that penetrates the pores to afford added protection as well as to accent the unique grain characteristics of white ash.

Upon receipt at the East Jefferson plant, the wood parts are inspected for dimensional accuracy by placing them in steel fixtures. The wood is then given three coats of varnish prior to assembly.

The all-steel body is prepared by the Chrysler Kercheval plant and shipped to the East Jefferson plant where the combined wood and metal parts are assembled.

The steel panels, wood framing, steel brackets, etc., are installed while the unit is held in a framing fixture. All joints are filled with a sealer and, where necessary, the steel panels are retained with sections of wood molding nailed to the wood frame.

After the preparation of the varied subassemblies, the bodies are ready for final assembly. The all-steel body shell is placed in a massive fixture where the

Combined Body

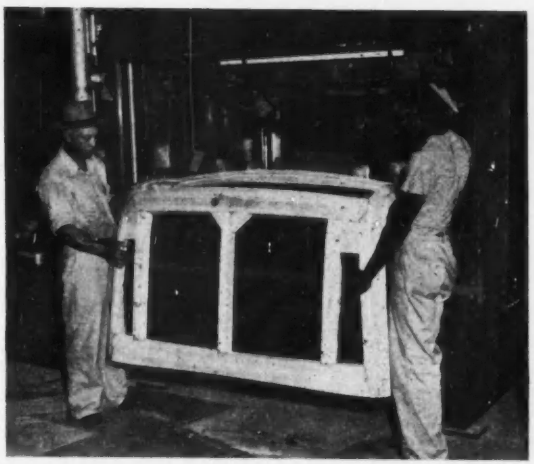
installation of wood and steel panels, completion of welding, and the attachment of steel parts is performed. The body is then bolted on a fixture, which is similar to the Town and Country chassis frame, for door hanging. By this method, there is assurance that doors will fit properly when the body is finally installed on the chassis.

Convertible bodies continue along the assembly line for the installation of wiring harness, assembly of the trunk lid and its mechanism, and finally the application of the top with its power mechanism and plumbing. Incidentally, the convertible top is tailor made and hand fitted, and it will now employ the hydraulic system for power operation.

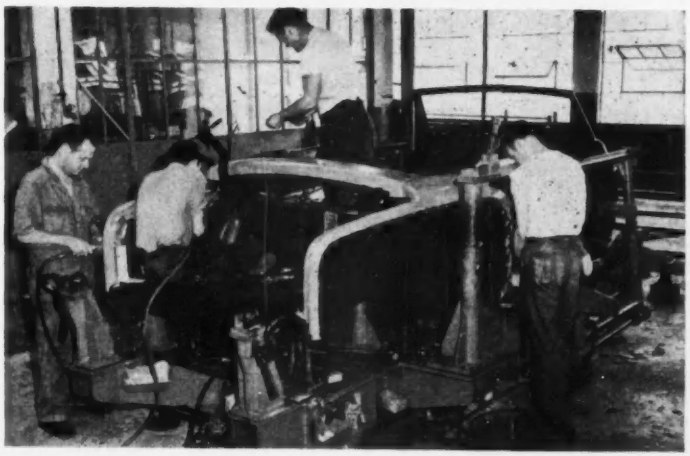
The bodies are then routed to a wet sand deck where all wooden parts are sanded. The metal portions of the body are then completely masked and the wood framing receives its final coat of varnish. This coating is an air-drying type so the bodies are kept in a large booth where a temperature of approximately 95 F is maintained.

The outer steel panels in the doors, quarter panel, and trunk lid are now finished in solid colors instead of the grain finish formerly used.

The rear quarter panel is held in a framing fixture while the operator fastens the wood and metal parts. Note how the metal fits in the slotted wood and is held by means of adhesive, wedges, and nailed moldings.



Typical of the subassemblies produced at the Pekin Wood plant is this trunk lid framing. The assembly is fitted in a form in the 15 ton hydraulic press where the joints, filled with phenolic resin, are cured under pressure of 145 psi while heated to a temperature of 170 F by high frequency electric current.



Here the all-steel body shell is clamped in a framing fixture where the attachment of wood framing parts, detail steel parts, and brackets is completed.

U. N. Conference on

International Road Transport

GENEVA, SWITZERLAND

RULES and regulations covering many aspects of international road transport were formulated at the United Nations Conference on Road and Motor Transport which held its sessions here during August and September in the Palais des Nations. Thirty-three nations participated in the Conference.

The following countries were represented at the Conference: Australia, Belgium, Brazil, Bulgaria, Canada, Chile, Czechoslovakia, Denmark, Dominican Republic, Ecuador, Egypt, France, Guatemala, India, Iran, Israel, Italy, Lebanon, Luxembourg, Mexico, Netherlands, Nicaragua, Norway, Philippines, Poland, Sweden, Switzerland, Thailand (Siam), Turkey, Union of South Africa, United Kingdom, United States of America, and Yugoslavia.

The composition of the USA delegation was as follows: H. H. Kelly, Chairman of the Delegation, Assistant Director, Office of Transport and Communications, Dept. of State; H. S. Fairbank, Vice Chairman of the Delegation, Deputy Commissioner U. S. Public Roads Administration; C. Connors, president, Association of Motor Vehicles Administration; John H. Hunt, Automobile Manufacturers Association; Charles A. Horan, Legal Assistant to Commissioners of Customs; Serge Koushnareff, Acting Chief of Transportation and Communications Branch of O.I.T., Dept. of Commerce; Edward G. Sparrow, American Automobile Association and American Touring Alliance; John W. Foley, Jr., Treaty Adviser, Dept. of State; John M. Cates, Jr., Adviser, Foreign Affairs Specialist, State Dept.; Mrs. Doris S. Whitnack, Adviser, Chief of Transportation Branch, Office of Intelligence Research, Dept. of State; Douglas M. Clarke, Road Transport Adviser, ECE Delegation; E. B. Sutton, Chief, Adviser Highway Transport, Military Government for Germany; C. F. Rogers, Adviser Highway Engineer, Public Roads Administration; Miss A. O'Rourke, Secretary to Chairman, Office of Transport and Communications, Dept. of State.

After an intensive four weeks of meetings, the Conference formulated a new International Convention on Road Traffic, a Protocol concerning the possible future accession of countries at present occupied, and the Final Act of the Conference. These instruments, including the Final Act, were made available for signature immediately after the final meeting. They remained open for signature in Geneva until Sept. 21, after which they were transferred to Lake Success where they may be signed by other governments later wishing to accede to them.

The Convention on Road Traffic consists of 35 Articles and 10 Annexes. It provides a detailed codification of the rules and regulations covering all aspects of international road transport, including the technical specifications to which roads and motor vehicles used in international traffic must conform, the basic rules of the road, certificates required by both drivers and vehicles, registration of numbers, and distinguishing signs. This new International Convention is designed to replace the existing Conventions on Motor Traffic and Road Traffic, respectively, which were signed in Paris in 1926.

Special Dispatch to AUTOMOTIVE INDUSTRIES

By Eugene F. Gonda

The new Convention, in many respects, goes further than the earlier conventions, particularly in regard to the technical specifications which it prescribes for motor vehicles and roads. In Annex Seven, the Convention sets out in detail the maximum sizes and weights of various categories of vehicles which will be permissible on those roads specially designated by contracting states for use as international highways. No similar provisions have ever before been written into an international convention on road traffic.

Other novel features of the Convention are the inclusion as Annex Nine, of a suggested model driving permit and, as Annex 10, a suggested model for an International Driving Permit. The Protocol on Road Signs and Signals consists of 64 articles and an Annex showing in diagram the different types of road signs referred to in the text.

At one stage of the Conference, it had been intended to include the regulations relating to road signs and signals as an Annex to the Convention, but this presented certain difficulties in view of the basic differences existing between the systems commonly in use on the American Continent and in Europe. Not only are the shapes and colors of the American signs different, but also far greater emphasis is placed on written warnings and instructions than in the various

(*Turn to page* 60, *please*)

NEW

Production and Plant

EQUIPMENT

For additional information please use coupon on page 52

E-65—Connecting Rod Gaging Machine

Representing an advanced step in mechanical measuring on a mass production basis, an automatic "Airlectric" gaging, classifying and segregating machine for automotive connecting rods has been developed by the Sheffield Corp. of Dayton, Ohio.

Automotive connecting rods are gaged completely for all critical dimensions and conditions, stamped with proper classification and suitably segregated at the rate of one every five seconds. The coordination of pneumatic and electrical circuits with mechanical actuating devices permits the checking

Sheffield automatic "Airlectric" gaging, classifying and segregating machine for connecting rods

of a variety of dimensions and conditions never before attempted on an automatic gaging machine, the company claims. These include checking for true diameter, average diameter, out-of-round, taper, squareness of face with bore, center distance between holes, width, bend and twist.

Only one operator is required. He loads the connecting rods on eight continuously rotating or indexing individual locating platforms located on a turret wheel which indexes in 45 deg stages. This permits the parts to be checked at each of the gaging stations mounted above the wheel. At the first station the connecting rod is presented to a pair of air spindles having several jets connected to Sheffield "Airlectric" gaging heads. The amount of bend and also the degree of twist is measured to a very close tolerance. Signals are transmitted to station No. 2 where the rod is retained on the turret if it has passed the bend and twist check. If not acceptable it is automatically ejected by a pneumatic device onto a conveyor belt which returns it to the straightening bench.

Acceptable parts are then indexed to the third station where center distance between the holes is gaged; also out-of-round. Following this, the width at the large end of the rod is inspected and simultaneously the squareness of the large bore with the face is checked. Next, the large bore receives a Go—Not Go diameter check, the taper of the small hole is gaged and the connecting rod is automatically stamped with one of three 0.0001 in. classifications of the small hole diameter. Automatic ejection of acceptable parts is made at the sixth station. Rods rejected at stations 3, 4 and 5 are not stamped but remain on the carrier wheel to be manually removed by the operator at the end of the turret wheel cycle and just prior to reloading.

All checking is done with air by means of the Sheffield "Airlectric" gaging head used in all pneumatic circuits at each station. Safety switches instantly stop the machine if interference is encountered. An additional safety arm and switch prevents the operator from reaching beyond the loading position. A comprehensive light panel facilitates setting up the machine and indicates to the operator which dimensions and conditions of rejected parts are beyond allowable limits.

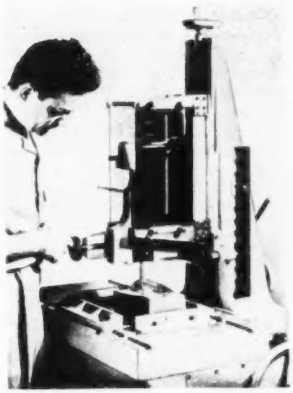
E-66—Semi-Automatic Die Checker

For quick, accurate and inexpensive visual gaging of contour profiles, flash and striking surfaces for forging dies and punches, the Pant-O-Scriber die checker is offered by Engineers Specialties Division of the Universal Engraving & Colorplate Co., Inc., Cleveland, Ohio.

Said to provide fast semi-automatic operation, a permanent inspection record of die sets, and periodic quality control check for die wear, it checks master die set, or wear, in relation to a master chart, checks duplicate die set, or wear, in relation to a master die, and permits checking of shrinkage between die and forged part.

In visual inspection the operator can view simultaneously the entire cavity, flash, or gutter profiles and striking surfaces of any desired cross section of dies and punches at a reported time of less than 60 seconds per section.

In addition, finishing operations or

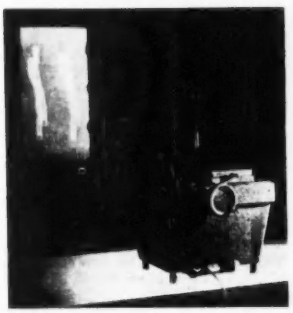


Pant-O-Scriber die checker, Model 400, for checking die sets for turbine and jet engine blades

modifications of dies can be made without removal from the die checker.

The Pant-O-Scriber takes die blocks up to 800 lb and sizes up to 22 in. length by 14 in. width by 12 in. thick, with larger units available.

Basic principle of the Pant-O-Scriber incorporates the X and Y pre-loaded ball-bearing movements and tracer roller features employed in the Pant-O-Jector and Pant-O-Scriber blade checkers. An adjustable and interchangeable follower, having a 0.125 radius, is attached to one end of an arm, on the opposite end of which is incorporated a motor driven free-floating rotating spindle. This spindle carries a "fly-



Pant-O-Scriber die checker viewing screen and measuring stage

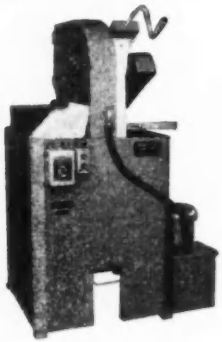
tool" type of scribing cutter head. This cutter rotates in circles which are exactly the same radius as the tracer follower. As the tracer moves across the die in the X plane, the motor driven scribing cutter duplicates the movements and in so doing "cuts" or "scribes" the colored film from the Pant-O-Scriber glass. The arm is also mounted on a cross beam in the Y plane, this pre-loaded assembly being

also similar to that of the Pant-O-Jector and Pant-O-Scriber blade checkers, and provides an accurate free movement of the tracing follower and the scribing cutters in the X and Y planes.

As the column is indexed to the second gaging position, determined by means of gage block settings, the Pant-O-Scriber glass also is indexed a known distance and the second section of the die is Pant-O-Scribed on the same glass. Up to nine sections can be scribed on each glass.

The Pant-O-Scribed glass plate is then removed from the machine and placed on the measuring stage of a vertical type Vu-graph Delineascope. A precision "one to one" ratio master chart is properly positioned on the delineascope, and the Pant-O-Scribed glass is placed in register with the master chart. Both the master chart and Pant-O-Scribed glass are in the proper focal plane and both are simultaneously projected onto an opaque white projection screen. The die contour and master, in contrasting colors, are in true relationship to each other as projected on the screen. This relationship would be unaffected by any possible imperfection of the projection lens.

E-67—Abrasive Cutting Machine



Campbell wet or dry bar type abrasive cutting machine, Model 15

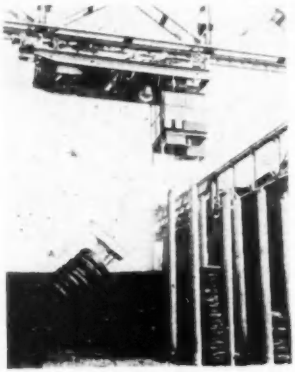
The Campbell Machine Division of American Chain & Cable Co., Inc., is offering a new Model 15 wet or dry bar type abrasive cutting machine fitted with either a 3 hp or 5 hp motor and suitable for general purpose work in cutting tubes, angles, bar stock, etc. The machine handled ferrous or nonferrous material, including corrosion resisting steels, and hardened or annealed steels. It cuts light wall tubing of all types up to 1½ in. diam and solid bar stock up to ¾ in. diam with the 3 hp motor, or light wall tubing up to 2 in. diam and solid bar stock up to 1 in. diam with the 5 hp motor.

NEW Production and Plant EQUIPMENT

For additional information please use coupon on page 52

E-68—Vertical Stacker For Rod or Wire

Storage capacity of a warehouse for rod or wire can be increased approximately 25 percent by means of a new vertical stacking hairpin hook and carrier brought out by the Cleveland Tramrail Division of the Cleveland Crane & Engrg. Co., Wickliffe, Ohio. Additionally, separation of rod and wire in numerous sizes and alloys is made possible through vertical piling.



Cleveland Tramrail vertical stacking hairpin hook and carrier

The vertical stacking unit handles 10 coils of 330 lbs each, or 3300 lbs total, at a time, picking them from horizontal position on floor or in gondola car and placing them in vertical piles supported by floor posts as illustrated. The unit also lifts off the coils from the vertical piles and places them into a horizontal position.

The grab mechanism is actuated by a built-in hydraulic pump which causes a spreader plate to expand or retract. In the expanded position, sufficient pressure is exerted against the inside diam of the coils to hold them firmly during handling.

All motions of overhead carrier or crane and the hook are controlled from the crane operator's cab. The operator can maintain records in his crane cab of entries and withdrawals and thus keep a perpetual record of rod or wire in the warehouse.

E-69—Single Gun Welding Machine

Graham single gun welding machine

Addition of a single gun machine to their line of welding equipment is announced by the Graham Mfg. Corp., Ferndale, Mich. Basic principle of the welder is a capacitor-operated, self-timed device using tip studs which, on coming in contact with the work and fusing, cause ionization. Ionization, in turn, allows a path for the main discharge current of the capacitor to form an arc sufficient to melt both the full diameter of the stud end and the work piece directly underneath. The necessary hammer blow which then follows causes the pieces to weld. Such complete cycle is brought about by a rapid, continuous movement of the stud-holding part, no retarding means being employed. The time of arc is about one mil second, making possible the use of very high currents.

Advantages of this extremely short arc time consist of concentration of heat, the welding of studs on very thin metal, no fillets, no distortion of work, no discernible heat, ability to weld studs on back of plated or painted surfaces without marring, no need of flux, and ability to weld dissimilar metals.

Some of the metals and alloys welded by this process are steel, stainless steel, monel, aluminum, magnesium, zinc, copper, and combinations of these.

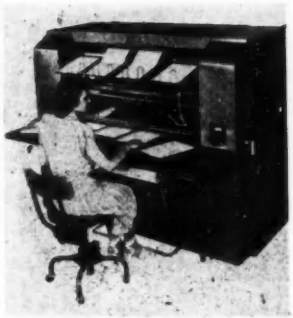
E-70—Foundry Core Baking Tunnel

Addition of the model M-285AD core baking tunnel to its line of ther-monic foundry core baking units is announced by the Induction Heating Corp., Brooklyn, N. Y. A low cost unit with capac-

ity of 375 lb of cores per hr and handling cores up to 16 in. wide by 7 in. high, the unit has a variable speed dial feed, adjustable electrodes and a complete blower exhaust system. The M-285AD is designed for the small foundry and is arranged so that both loading and unloading may be handled by the same core maker.

F-88—Drafting Room Printing Machines

At the National Metal Congress and Exposition in Cleveland October 17 through 21 the Charles Bruning Co., Inc., of Chicago, Ill., demonstrated new Whiteprinting machines and also introduced their Model 50 Whiteprinter for the first time.



Bruning Whiteprinter, Model 50

This compact Model 50 machine has a variable printing speed up to 24 fpm. and under actual working conditions can produce 10,000 sq ft of BW prints in a working day, according to the company. Smaller equipment for making office copies and small prints also were shown for the first time and consisted of the new, streamlined office model 10 Bruning Whiteprinter. Other Bruning Whiteprinters likewise demonstrated included the Volumatic model 93 for large volume production, and the model 21 for small volume production.

These Whiteprinters copy drawings, documents and any other work that has been drawn, printed, typed, or written upon translucent or transparent material. The prints are direct positive prints having sharp, clean lines on white or tinted paper and are produced without use of intermediate stencils or negatives.

Whiteprinters offer many time-saving uses for engineering departments, drafting rooms, and offices, by producing a variety of prints, including BW prints with black, red, brown or blue lines; BW prints on light, medium or card-weight white papers; BW prints on medium-weight pink, yellow, blue, or green-tinted paper; and BW prints on transparent paper, cloth, and film.

NEW ★ PRODUCTS

For additional information please use coupon on page 52

Additionally, a new Bruning reflex film was shown which enables reproducing of any matter which is printed, typed, written, or drawn on opaque material—or on both sides of a sheet.

Other new recently developed, or redesigned Bruning products on display included the Equipoise standard drafting machines, lettering guide, Perspect-O-Metric (a device for making drawings in perspective), and hollowshaft electric erasing machine. Likewise shown were the Hamilton four post drawing tables, 5-inch and 10-inch slide rules, drawing board cover paper, Bruning refillable pencils, tracing papers, and other drafting room supplies and equipment.

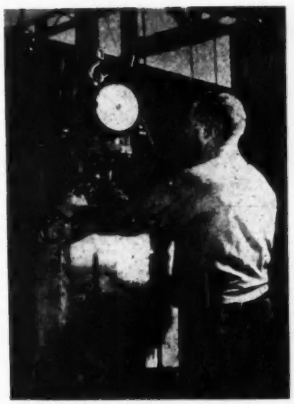
F-89—Standardized Heat Exchangers

Young Radiator Co., Racine, Wis., announces its new line of stock Type F (fixed tube bundle) tube and shell type heat exchangers, standardized to offer economies in these four ways: First, savings due to economies afforded by mass produced units; second, savings due to economy of quantity purchases from standard sizes; third, savings on delivery time from warehouse stocks; and fourth, savings on maintenance costs by reason of completely engineered design and construction and standardized parts replacement.

These Type F heat exchangers, made of corrosion-resistant Admiralty tubing, are available in Single Pass or Two Pass types (illustrated). Single Pass units may be selected for easier piping arrangement and are ideal when the temperature difference of the two fluids is small. Two Pass heat exchangers should be selected if water supply is limited, and where temperature difference between the two fluids is greater.

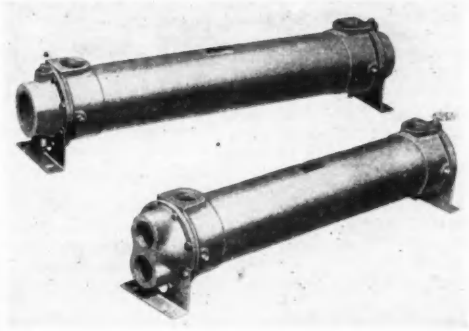
Designed to handle either fresh or salt water requirements, the line has been engineered for water to water and oil to water cooling in a wide range of applications such as marine engines, stationary diesels, torque converter cooling for buses and trucks, hydraulic presses, diesel-electric locomotives, dynamometers, and transformers.

F-90—Hydraulic Crane Scale



Shows weighing metal stock is this new type self-contained hydraulic crane scale put out by the Baldwin Locomotive Works, Phila., Pa. Loads are transmitted by an Emery cell—long used on testing machines—to a precision type Bourdon tube, the deflection of which moves the pointer on the dial. Crane scales are available with 13 scale ranges from 0-1000 to 0-30,000 lb. for use indoors or outdoors.

(*Turn to page 48, please*)



Young heat exchangers, type F.

NEW ★ PRODUCTS

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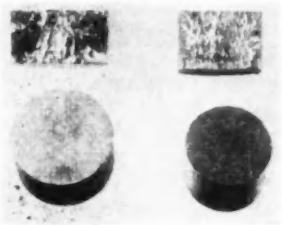
F-91—Permanent Magnet Materials

The General Electric Co., Pittsfield, Mass., has developed two permanent magnet materials. One is G-E Alnico 5 DG, a modification of Alnico 5, in



GE Alnico 5 permanent magnet and Alnico 5 DG permanent magnet showing directional grain of the Alnico 5 DG

which the crystal structure of the magnet is aligned in the direction of magnetization, the letters DG referring to directional grain. A change in the manufacturing process makes this new structure possible. As a result, manufacturers who use permanent magnets may now use smaller magnets to do the same jobs larger magnets formerly did. Alnico 5 DG will provide manufacturers of radio speakers, magnetic separators, motors, instruments, and other industrial products with the highest external and residual induction of any permanent magnet material known today, the company states.

The other new permanent magnet material is known as G-E Alnico 7 and has also been developed specifically for applications where a high demagnetization force is present, such as in motors, generators, and variable air gap devices. This new magnet is claimed by the company to show a higher coercive force than any other grade of Alnico.

F-92—Three-Phase Welding Control

A new three-phase, low frequency welding control, designed to operate a welding transformer so as to draw power from a three-phase line and convert it to a lower frequency single-phase, and supply this to the electrodes of a resistance welder, is available from Westinghouse Electric Corp., Pittsburgh, Pa.

High power factor characteristics inherent with low-frequency current result in reduced KVA demand for any given number of amperes at the electrodes. The total power demand is spread over all phases of any standard three-phase, 60-cycle, 220-, 440- or 550-volt primary power source.

Weld quality is better because the

Westinghouse three-phase, low frequency welding control

wave shape obtained with three-phase control allows for a smooth flow of heat into the metal.

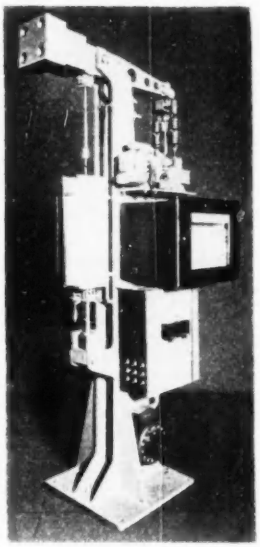
A complete packaged unit that controls all mechanical and electrical functions of the welding machine is available. It can be mounted on the floor or on the side of the machine. A swing-out panel provides access to all components and circuits.

F-93—Relaxation Testing Machine

By means of a new machine of 4000 lb capacity announced by the Baldwin Locomotive Works, Phila., Pa., relaxation tests at temperatures up to 1800 F can be carried out automatically, including a record of the rate of decline of load. Relaxation occurs when a material is stretched to, and held at a given elongation, as in bolts, particularly at elevated temperatures. Creep then tends to elongate the bar and release the load. Elastic shortening balances this effect and total strain remains constant. Plastic elongation can be measured by the decrease in stress.

Relaxation tests are also useful beyond the direct application of data on the behavior of metals at constant total strains. They establish the relative ability of a material to withstand stress at high temperature. They are also valuable in estimating creep values in certain ranges of stress and temperature for high strength alloys and in predicting mechanical properties of metals at high temperatures. Tests of 150 hr duration have been commonly employed.

The machine automatically relaxes tensional loads from as high as 40,000 lb per sq in., permitting strain increments of only 2 x 10^{-6} in. per inch of the 6-in. gage length of a standard 0.356-in. diam specimen. These increases in length are detected by a highly sensitive extensometer with electric contacts that close a 6-volt relay circuit and thus operate a ¼ hp servo motor to reduce the load enough to open



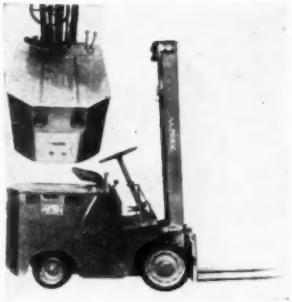
Baldwin relaxation testing machine

the contacts again and to maintain a substantially constant strain.

The load is reduced through a worm and gear box, iso-elastic springs by which the load is measured, and a lever arm with a mechanical advantage of 8 to 1. Accuracy is held to approximately 1 per cent of load or 0.25 per cent of capacity. The recorder produces a curve of stress vs time on a flat chart slightly less than 10 in. wide. The stress axis is driven indirectly from the spring loading device.

The furnace is 18½ in. long, 8¼ in. O.D. and 2½ in. I.D. It may be controlled within 5 deg F or less, or within 2 deg F or less depending upon the controller used with it.

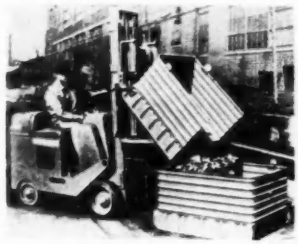
F-94—Short-Turn Industrial Trucks



For increased maneuverability and faster handling of materials in confined storage areas, the Industrial Truck Division of the Clark Equipment Co., Battle Creek, Mich., now is offering special short-turn models of its electric battery-powered Clipper Carloader and Utilitruc featuring reduced turning radii. Models are 2000-, 4000- and 7000-lb capacity respectively; standard models remain unchanged. Redesign of the trucks' battery compartments and counterweights to provide angled corners has reduced the turning radii by 6½ in. on the 2000-lb truck, 6¼ in. on the 4000-lb truck and 6 in. on the 7000-lb truck.

F-95—Skip Box Dump Device

Latest development of the Towmotor Corp., Cleveland, Ohio, for mass handling is a skip box dumping device for use in plants where a great quantity



Skip box dumping device devised by Towmotor and installed on a Model LT-48 lift truck.

of heavy, loose parts must be constantly lifted, moved, stored or delivered to busy production lines. A special hydraulic dumping device tilts the box while it is held in an elevated position, handling loads up to 4000 lb.

This three-sided box is fitted with metal rings at the back. Special hooks on the lift truck carriage engage these rings when the box is lifted by the forks. To dump the box, the truck operator actuates a double-acting hydraulic cylinder which raises the hooks, tilting the box forward, allowing the load to flow out through the open front.

NEW ★ PRODUCTS

For additional information please use coupon on page 52

Two sets of vertical coil springs which have been compressed in the dumping action assist in returning the box to a horizontal position. The box is disengaged by lowering it to the floor and backing the lift truck away from it.

F-96—Induction Heating Unit

Announced by the High Frequency Heating Division, Lindberg Engineering Co., Chicago, Ill., is an induction heating unit, type LI-25, having a conservatively rated output of 25 kilowatts at 100 per cent duty cycle with a normal frequency of 450,000 cycles per second. Units are available for operation on 230, 460 and 550 volt, 3 phase, 60 cycle power. A manually operated tap switch allows the operator to compensate for line voltage changes.

Recently developed industrial tubes

Lindberg induction heating unit, type LI-25.

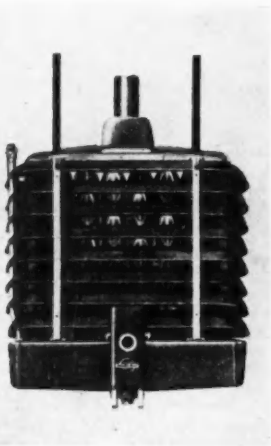
are used throughout with all filament voltages automatically controlled by voltage regulating transformers. To prevent harmful condensation, the unit is equipped with "conditioned cooling," a closed system which circulates temperature controlled distilled water through water cooled components. Other advantages claimed are reduced water consumption, lower water pressure requirements and safe operation with hard water.

Servicing is simplified by "Checklite," a system of indicating lamps which instantaneously reveals abnormal conditions at any one of the protective devices. All electrical overloads can be reset by the flick of a switch on the front operating panel. Work coils are protected from burn out by an interlocked solenoid valve which controls work coil cooling water.

Standard equipment includes a synchronous timer with vernier heat cycle adjustment and additional circuits to control two other operations such as, quench, fixture movement, etc. The LI-25 is available with one or two working stations, each complete with both high and low impedance terminals.

F-97—Heat Unit For Work Areas

"Overhead Panelray", a gas-fired heating unit that heats working areas like the sun heats the earth, is announced by Day & Night Division, Affiliated Gas Equipment, Inc., Monrovia, Calif. The new device utilizes infrared rays and provides instantaneous heat that warms occupants and solid objects regardless of air temperature. These healthful infra-red rays, traveling in a straight line and at the speed of light, cannot be diverted by drafts or air currents. Thus, for the first time, a successful gas appliance is said to have been developed for heating entirely exposed areas or enclosed spaces frequently exposed to outside elements.



"Overhead Panelray", gas fired heating unit of Affiliated Gas Equipment, Inc.

When used in buildings which are entirely enclosed, the air is heated as quickly as with any other type of heater and natural circulation takes place, but

warm floors and working areas are kept constantly comfortable by the direct infra-red rays.

In its application to industrial installations infra-red rays are directed downward by a series of louvres in the unit. "Cold spots" are eliminated as floors and working tools are quickly warmed by the penetrating rays. Absence of fans or blowers assures noiseless, draftless and dustless operation. The unit occupies no usable space, is automatic, completely **vented** and A.G.A. approved.

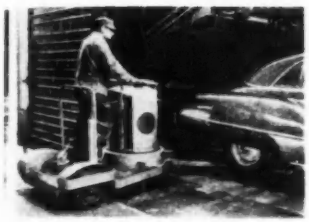
Since no fans or blowers are needed, electrical connections and all moving parts have been eliminated.

NEW ★ PRODUCTS

For additional information please use coupon on page 52

F-98—Assembly Plant Auto Loader

For production handling of bottlenecks in rail car loading of automobiles at assembly plants the Salsbury Corp. of Los Angeles, Calif., comes forward with an adaptation of a conventional tractor tug and their special hydraulic jack, combined in a unit called Autow Loader.



Salsbury Autow Loader.

By means of this automatic hydraulic jack coupled to the front of the Salsbury Turretug it is possible to jack up the rear end of the largest cars manufactured and move them to the correct position in the rail car with most prompt dispatch. The jack, coupled to the front of the tractor tug with a toggle ball joint, is raised hydraulically by a foot lever operated from the platform of the tractor tug. It is lowered by means of a hand lever. In slack car loading periods, quick disconnection of the hydraulic line permits the tractor tug to be used without the jack in other plant operations.

In loading rail cars, the operator runs the jack under the differential housing of the automobile, jacks it up, and moves forward. Another operator, walking beside or seated inside the automobile, steers the front end into the rail car while the Autow Loader operator pivots the rear of the automobile around and quickly moves it inside the rail car.

Danger of damage to the new cars is highly minimized by the extreme maneuverability claimed for the Autow Loader, accomplished with a fully rotatable power turret having a turning radius of 360 deg. with instant response.

The turret-power unit consists of a six hp. air-cooled Wisconsin engine, an automatic clutch and transmission, and a reduction gear and drive wheel, mounted on a rotating table. These elements are housed under a dome in which is located a 3½ gallon gasoline tank and about which runs a throttle control ring. The clutch is said to take hold automatically with a smooth, positive action as the engine speed is increased, and to disengage automatically upon deceleration. Capacity of the Loader is 4000 lb.

F-99—Vibration Frequency Pickup

Called the "Vibratab" is a vibration frequency pickup the size of an aspirin tablet; only 5/16 in. in diam. and weighing less than a gram, which is claimed by the Telecomputing Corp. of Burbank, Calif., to have extraordinary physical characteristics for opening a new field to vibration study. The Vibratab will fit into restricted spaces hitherto inaccessible to much larger conventional size instruments, its light weight permitting accurate testing of highly sensitive test structures without danger of influencing vibration characteristics. Having a life expectancy of 100 to 300 hr, it is said to respond to acceleration frequencies from 3 to over 2000 cycles per second.

Telecomputing Corporation's vibration frequency pickup, the "Vibratab"

Vibration, research and instrumentation engineers, the company believes, will find the Vibratab a valuable new tool for rocket and missile study, flight testing of aircraft control surfaces, wind tunnel experimentation, power plant and accessory testing, automotive research, etc. Also supplied are automatic machines for accurately and quickly reading, counting and recording oscillogram records produced by the Vibratab.

F-100—Small Pilot Valves

Hanna Pilot valves.

A series of small pilot valves for direct control of small cylinders or automatic control of large cylinders is being placed on the market by Hanna Engineering Works, Chicago, Ill.

Pilot valves are available in cam, lever, push button or foot operated types. All are 3-way valves except the foot operated units which are 4-way.

Cam operated valves feature a spring loaded roller which can be actuated by a straight line or rotary cam. The roller can be rotated 90 deg. In the lever operated unit, the lever can be rotated 90 deg.

Single and double pedal foot operated pilot valves offer hand-free control of cylinders. The double pedal type gives full control of both directions of cylinder; the single pedal valve offers semi-automatic control. Automatic control of large cylinders is achieved with pilot valves through Hanna Mastair valves.

(*Turn to page 56, please*)

PERSONALS

Recent Personnel Changes and Appointments at the Plants of the Automotive and Aviation Manufacturers and Their Suppliers.

Packard Motor Car Co.—**George T. Christopher** has announced his resignation, which will become effective December 31st, 1949. **Hugh J. Ferry**, company Vice-President and Secretary-Treasurer, was elected to the newly created post of Executive Vice-President. Ferry will continue as Treasurer. **E. C. Hoelzle**, Vice-President and Comptroller, was also named Secretary.

General Motors Corp. — **Herbert M. Gould** has been appointed General Manager of the Motors Holding Division.

Chevrolet Motor Div., General Motors Corp.—The following appointments have been announced: **W. J. Scott** has been made General Manufacturing Manager; **R. G. Ford** is Manager of Assembly Plants; **E. S. Wellock** Manager of Manufacturing Plants; **Gerard M. Haley** is Director of Purchases and **E. F. Gormsen** is Purchasing Agent, Central Office.

Mack Trucks, Inc.—**D. C. Wheeler**, recently elected a Vice-President of the company, has been named head of the new sales division, known as the Southwestern Div., with headquarters in Dallas.

Hudson Motor Car Co.—The appointment of **W. H. Rivett** as Traffic Manager has been announced.

Reo Motors, Inc.—**A. L. Struble** has returned to Reo as Asst. General Sales Manager in charge of branches.

Lincoln-Mercury Div., Ford Motor Co.—**Chris J. Fournier** has been named Asst. Service Manager.

Willys-Overland Motors, Inc. — The appointment of **Samuel G. Morse** as Supervisor of territories and franchises has been announced.

Hudson Motor Car Co. — Appointment of **Thomas P. Rhoades** as Director of Public Relations has been announced.

Westinghouse Electric Corp. — **Edward G. F. Arnott** has been named acting research Director of the Lamp Division.

Perfect Circle Corp.—Announcement has been made of the appointment of **Richard H. Bancroft** as Executive Engineer.

Borg-Warner Corp., Ingersoll Steel Div. — **Frank J. Nugent** has been appointed Sales Manager of the Heating Equipment Div.

Heli-Coil Corp.—**Paul Stafford** has resigned as Sales Manager, due to a change of ownership.

The Bullard Company — **H. Edward Neale** has been named Chicago direct representative succeeding **George York**, recently deceased.

Natl. Lubricating Grease Institute—**Arthur J. Daniel** has been elected President of the Institute.

Purolator Products, Inc. — **Jules P. Kovacs** has been elected Vice-President in charge of engineering. **John T. Gaffney**, acting purchasing agent has been appointed Purchasing Agent.

Clearing Machine Corp.—**Francis J. Sehn** has joined the staff of the Detroit office as Sales Manager.

Detrex Corp.—The election of **E. W. Allison** as Secretary-Treasurer has been announced.

Minnesota Mining & Mfg. Co.—**Lloyd A. Hatch**, Vice-President, has been assigned to the job of coordinating research and new product development. **Clarence B. Sampair** is Vice-President in charge of production and **C. F. Pesek**, Vice-President in charge of engineering.

Necrology

Alfred A. Knight, 73, retired assistant purchasing agent of the Auto-Lite Battery Corp., Niagara Falls, N. Y., died Oct. 4.

John D. Halen, 60, founder and president, General Die and Tool Co., died Oct. 9 in Cleveland.

Lawrence P. Wittenberg, 49, GM official and director of employe activities, died on Oct. 11 in Detroit.

Burt Roberts, 73, former executive secretary of the Los Angeles Motor Dealers Association, adviser to its board of directors, and secretary of the Motor Car Dealers Association of Southern California, died on Oct. 11 in Los Angeles.

Joseph L. Hurley, 60, former executive of the old Pierce-Arrow Motor Car Co., Buffalo, N. Y., died Oct. 5 in Erie, Pa.

C. Howard Henderson, 53, a former executive of the Curtiss-Wright Corp., in Buffalo, N. Y., died Oct. 7.

Yale and Towne Manufacturing Co. — **A. Charles Amann** has been appointed Industrial Sales Manager of the Stamford Div.

Airquipment Company and Aerol Company (subsidiaries of Lockheed Aircraft) — **W. C. Kennedy** has been appointed General Sales Manager.

Richfield Oil Corp. — **William G. King, Jr.**, has been elected Vice-President of the company and appointed General Sales Manager.

The Glenn L. Martin Co. — **William B. Bergen** has been named Chief Engineer.

Aircraft Industries Assoc. of America, Inc.—**R. W. Markley, Jr.**, recently with Douglas Aircraft Co., has been made assistant to **George Hannaum**, Director of Industry Planning Service.

California Cold Rolled Steel Corp.—**F. L. MacQuarrie**, President and Founder of the company, has retired. **James E. Lewis**, formerly Vice-President and General Manager, succeeds Mr. MacQuarrie as President.

General Metals Corp.—**Roy C. Menzel** has been promoted to the position of Secretary and Treasurer of the corporation.

United States Rubber Co., Fiske-Gillette Tire Div.—**Hugh L. Hayward** has been appointed Advertising and Sales Promotion Manager.

Gould Storage Battery Limited of Canada — **N. J. McCartney**, formerly Sales Manager, has been promoted to Vice-President in charge of Sales for Canada.

The B. F. Goodrich Co.—**Joseph D. Kelly** has been named Sales Promotion Manager for passenger and truck tires.

E. F. Drew & Co., Inc.—The appointment of **George R. Johnson** as Sales Manager of the Automotive Chemicals Div., has been announced.

Eclipse Corp. — **Frederick A. Mattfield** has been appointed Factory Manager of the Elmira, New York, plant.

American Bosch Corp.—**W. Hubert Beal** has been appointed Management Consultant for the company.

Modern Metal Products Co.—**Harold E. Cordell** has been made Vice-President in Charge of Sales.

Gulf Oil Corp. — **A. Wayne Gordon** has been named Asst. General Manager in charge of fleet markets. He will be responsible for direct product sales to automotive and truck fleets.

PUBLICATIONS AVAILABLE

Publications listed in this department are obtainable by subscribers through the Editorial Department of AUTOMOTIVE INDUSTRIES. In making requests please be sure to give the NUMBER of the item concerning the publication desired, your name and address, company connection and title.

D-102 Rust Prevention

Angier Corp.—An attractive illustrated booklet has been released by the company citing case studies on actual industrial applications of Angier Vapor Phase Inhibitor (VPI) the vapor method of rust prevention introduced by Angier some time ago.

D-103 Tooling Practices

The National Acme Company—Bulletin TP-44, Tooling for Top Performance, is a new booklet, confined to tooling practices. All performance studies are grouped by class of operation, for ready reference. Many photographs illustrate the text in the booklet.

D-104 Die Heads

The Eastern Machine Screw Corp.—Bulletin No. 16 describes and illustrates the Style TM Insert Chaser Die Head for cutting superior quality taper pipe threads.

D-105 Carburizing and Selective Hardening

Denfis Chemical Laboratories, Inc.—A 6-page folder gives detailed data with photographs of the application and use of Carburit Pack-Hardening Paste and Isopac Isolating Paste.

D-106 Fuel Oil Additive

E. F. Houghton & Co. — Houghto-Solv, a fast acting fuel oil additive which dissolves sludge in oil storage tanks, etc., is described in a 6-page folder. In addition to describing the physical composition of the additive, the folder features many photographs, including enlarged micro-photographs showing Houghto-Solv dispersing sludge deposits.

D-107 Strip and Spring Steels

Precision Steel Warehouse, Inc. — Many facts for steel buyers and users are presented in concise fashion in a new pocket-size 98-page catalog now available. Designed to give complete specifications on all Precision Brand Steel products, the catalog also serves as a handy reference guide for steel purchasing agents. A Glossary of trade terms, decimal equivalent tables, comparative tables, etc., are included.

D-108 Durco Corrosion Resisting Alloys and Equipment

The Duriron Company, Inc.—A new 12-page catalog gives condensed data published in separate bulletins on corrosive resisting equipment and alloys. The catalog was compiled for the operating, maintenance, consulting, plant, chemical and corrosion engineer. It covers Durco Corrosion Resisting Alloys, Durco Corrosion Resisting Equipment. The data on each item includes features, capacities and sizes, available alloys, etc.

D-109 Fasteners

South Chester Corp.—A new 28-page manual features full descriptive and engineering data on Southco blind rivets, anchor nuts, panel fasteners, door-retaining springs, etc., and various newly-developed items. Applications are shown in fastening metal to metal, metal to plywood and many other combinations.

D-110 Thread Milling Machines

Pratt & Whitney—An attractive 4-page folder describes and illustrates the company's thread milling machines. Specifications, sizes and prices are given.

D-111 Radiation Pyrometers

The Bristol Co.—A bulletin on the new Bristol Pyrovisor Radiation Pyrometer is available. It explains the theory of radiation pyrometry and the features of the pyrovisor radiation unit. Also included are photographs

(*Turn to page 54, please*)

TIME SAVER COUPON for your convenience in obtaining, WITHOUT OBLIGATION, more information on any one or more of the publications described above OR New Production and Plant Equipment OR New Products items described on other pages.

Readers' Service Department,
Automotive Industries,
Chestnut & 56th Sts., Philadelphia 39, Pa.

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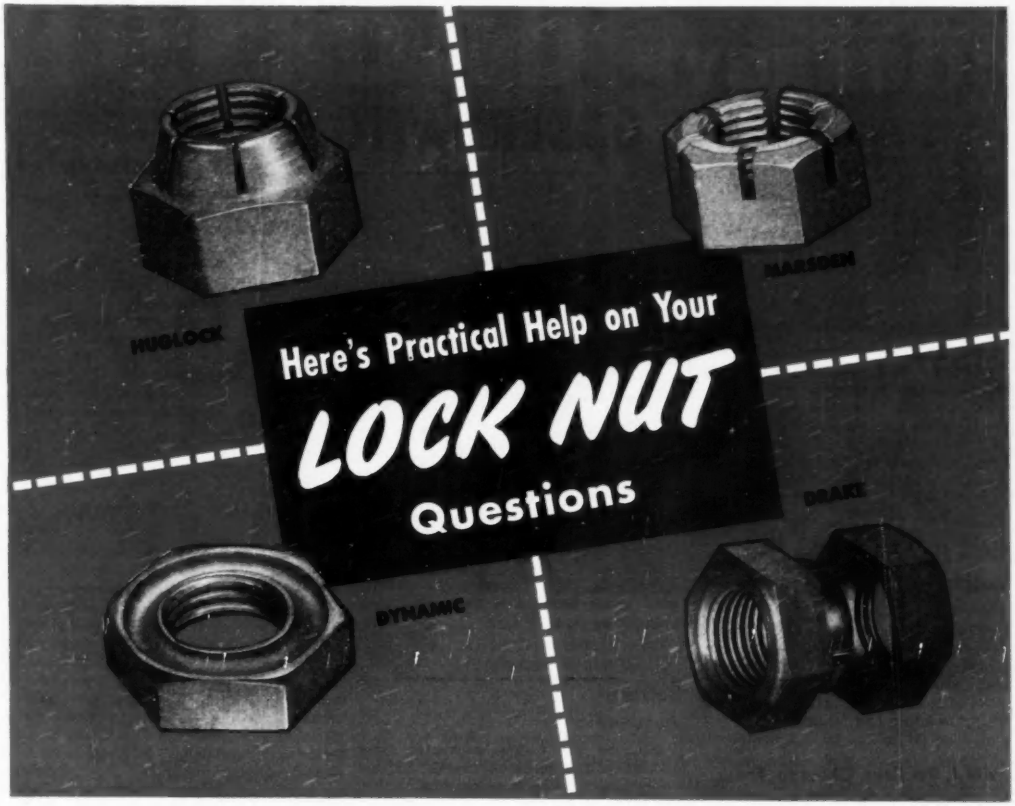


Every problem of vibration and loosening of parts calls for careful study to find just the right answer. "National" engineers have encountered just about every type of problem, and our line of Lock Nuts is designed to meet an unusually wide range of requirements. The booklet illustrated here contains much useful data and should be helpful in determining type, size and cost of lock nuts for a given application. A copy will be sent on request.

Other "National" products:
HODELL CHAINS,
CHESTER HOISTS.

For heavy duty — National's "Drake" Lock Nut withstands severe stress, shock or vibration. A two-piece, positive lock for use on rugged, heavy equipment, where size and weight are not a factor.

To withstand shear only — National's "Dynamic" Lock Nut is a thin, lightweight nut with diaphragm lock, for use where clearance is a factor and where strains are in shear only.

For shock-loading or vibration, even under heat, oil or moisture, National's "Huglock" Lock Nut is a one-piece, all-metal lock nut. Easily installed, it grips the bolt threads and maintains locking effect whether seated or not.

For effective, low-cost locking. National's "Marsden" Lock Nut is a one-piece, cantilever action type, easily applied, free running until seated. For the most complete line of standard and special fasteners, come to "National".

National
HEADED AND THREADED
PRODUCTS

THE NATIONAL SCREW & MFG. CO.
Cleveland 4, Ohio
Pacific Coast: **National Screw & Mfg. Co. of Cal.**
3423 So. Garfield Ave., Los Angeles 22, Cal.

and diagrams illustrating accessories to adapt to the unit.

D-112 Strain Gages

The Baldwin Locomotive Works—A new 12-page catalog of Baldwin SR-4R bonded resistance wire strain gages, illustrated by line drawings and listing 102 standard gages, is available. A table gives electrical resistances, gage factors, dimensions and prices. The catalog also lists SR-4 equipment and accessories used with the gages.

D-113 Magnetic Equipment

Dings Magnetic Separator Co.—An illustrated, 8-page bulletin describes Dings electric and non-electric magnetic pulleys, non-electric magnetic drums, triple pole rectangular magnets, etc. Data includes brief specifications, lists applications and features of equipment designed for separation of magnetic and non-magnetic products.

D-114 Plate and Sheet Cutting Machines

American Pullmax Co.—A 6-page folder describes the company's line of sheet steel and plate working machines. Seven different sizes of machines are described, as well as attachments for straight, circle and slot cutting, beading and folding.

AMA Declines Chicago Train Facilities for Car Show

The board of directors of the AMA has turned down a proposal that the automobile manufacturers take over facilities used for the past two years at the Chicago Railroad Fair for a national automobile show next year. One principal reason for the objection is that the Chicgo automobile dealers have already been working for several months and have several thousand dollars invested for an automobile show in Chicago next February. The question of a national automobile show was handed back to the sales manager committee of AMA for further study, indicating that such a show is still a long time away.

GMC Gets Truck Order from Israel

GMC Truck & Coach has received an order frm the government of Israel for 1069 trucks. Of the total, about 600 are for the armed forces of Israel. Dodge has also received an order for an unspecified number of trucks for Israel. Ford a few months ago made a deal with Israel for sale of about 1800 trucks on a long term financing agreement. Dodge and GMC have not revealed the financial terms of their deal however.

OBSERVATIONS

By JOSEPH GESCHELIN

Chrysler Scores

Chrysler Corp. was host at the opening meeting of Detroit Section SAE, drawing the most impressive attendance known in these parts. The official count, based on dinner tickets, was 1350 but that figure seemed quite conservative. Fred Zeder, dean of Chrysler engineers, was in rare form as the banquet speaker, taking as his theme the urgent need for raising the level of social and policial thinking to the level of scientific accomplishment. The tour of Chrysler laboratories, always a source of inspiration, proved even better because of the time available before dinner.

Battle of Automatics

Because the torque converter type automatic transmission marks an entirely new road in mass production, we are witnessing an epic performance by some big competitors. Buick, the first in production, had by far the biggest handicaps to overcome in developing manufacturing techniques. By the time Packard was ready they were able to take stock and turned up with some unique departures from conventional practice by using composite materials joined by silver brazing. You will find more on this in a series of articles now in preparation. The third giant to enter the scene—Chevrolet—is said to have developed short cuts that may well change the picture of torque converter fabrication. One feature, already widely discussed, is the adoption of stamped and brazed assemblies for converter wheels. More recently we learned of even more dramatic simplification in the processing of certain component parts.

Flame Hardens

We have it on good authority that one of the engine builders has found it feasible to flame harden Diesel crankshafts. This company was faced with the problem of hardening a large variety of crankshafts of different sizes in relatively small lots which made the cost of induction hardening tools and equipment quite prohibitive. As we understand it, the company has found a simple way of mounting cranks in a lathe and flame hardening pins and journals with excellent control. Imagineering on the part of production management has scored another important success.

Clay Model

By now most people are familiar with the clay modeling work done by art and styling sections in the development of body and sheet metal contours. In a recent visit to the Firestone plant in Akron we learned that clay modeling plays an important role in tire development as well. With tire engineers constantly dreaming up unique tread patterns Firestone found it difficult to visualize new patterns in a plane projection on the board. So they have a skilled artist making up clay models to exact scale from drawings. The artist has a modeling board or fixture with arms at 90 deg, permitting the building up of a complete quadrant in full size with tread and side wall patterns executed to high dimensional accuracy.

Radiator Defined

People in the cooling field would find life simpler if engineers and others in the motor vehicle industry would use approved nomenclature, at least for defining the radiator. SAE nomenclature recommends the following:

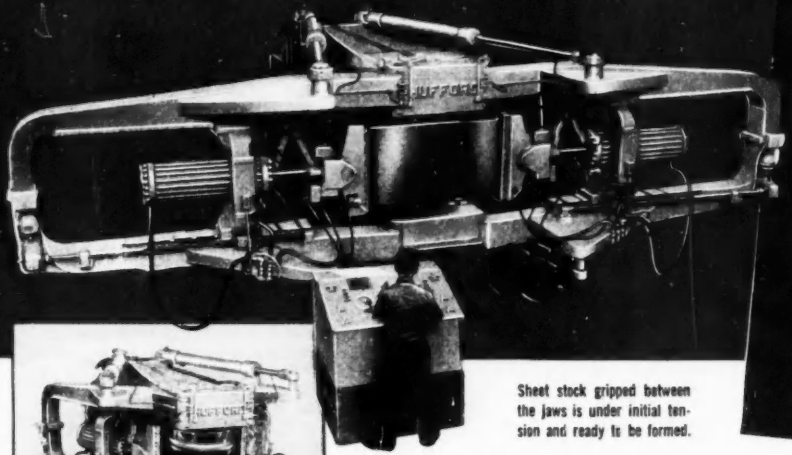
1. Individual Fin and Tube Core: An assembly of fluid tubes to which are attached gills or fins, each tube and its fins forming a separate unit.

2. Continuous Fin and Tube Core: An assembly of fluid tubes joined together by radiating fins or plates common to all tubes or groups of tubes.

3. Ribbon Cellular Core: A number of fluid passages made by joining metal ribbons at the edges and grouped to form a cellular structure.

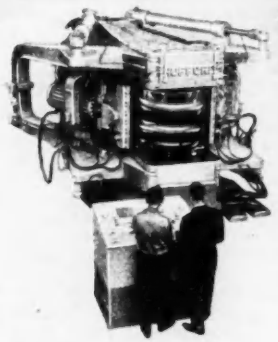
4. Air Tube Cellular Core: An assembly of air tubes nested so as to form fluid passages between the tubes, the passages being sealed at the ends of the tubes.

HUFFORD HYDRAULIC STRETCH-FORMING MACHINES



Sheet stock gripped between the jaws is under initial tension and ready to be formed.

Another COST-CUTTING APPLICATION of VICKERS HYDRAULICS



Upon completion of forming operation, sheet is stretched to "set" material to die contour.

A vital factor in the economy, high production and accuracy of Hufford Hydraulic Stretch-Forming Machines is the Vickers Hydraulic Equipment used for both power and control. On the Model 50 machine shown here, the power is furnished by Vickers Balanced Vane Type pumps (two-pressure and single); all the hydraulic control valves are also Vickers. The required versatility is provided, and the control of complex movements is easy and accurate. All controls are handled by "finger touch" levers in the control panel.

Vickers Hydraulics improve the operation of many machines . . . particularly those requiring selectivity of control and adjustment to suit type of work. Any sequence of motions can be provided . . . made automatic if desired. Vickers Hydraulic Equipment is inherently self-lubricated . . . easily protected against overload. By means of interlocks, incorrect or unsafe operation can be prevented. Get in touch with the Vickers Application Engineering Office near you for suggestions on how Vickers Hydraulics can improve your machinery. 3998

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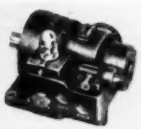
ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

Representative Vickers Hydraulic Pumps and Controls Used on Hufford Stretch-Forming Machines

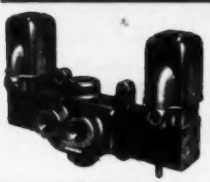


Two-Pressure Vane Pump

Rotary Pilot Valve

Relief Valve

Lever Operated 4-Way Valve



Solenoid Controlled Pilot Operated 4-Way Valve

Right Angle Check Valve

Flow Control Valve

Vane Type Pump (Single)

(Continued from page 50)

F-101—Core Drill Cutter

Addition of a core drill cutter to their standard line of precision production tools is the latest news from Scully-Jones and Co., Chicago, Ill. Available in 25 different sizes from 1½ in. to 3 in. in cutter diameter, the new high speed steel core drill cutter will remove approximately 45 per cent of its diameter—i.e., the 3-in. cutter will enlarge a 1⅝ in. hole to 3 in.

Only four holders are needed for the entire series of 25 sizes of cutters. The new cutters are 4-fluted for twice as fast feeding as the two fluted twist drill. The narrow lands and small de-

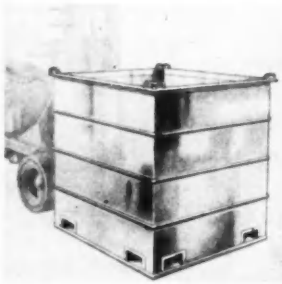
Scully-Jones core drill cutter

gree of back taper decrease friction, allowing more power for profitable cutting. Tests are said to show that savings up to 48 per cent can be realized by using the cutters in conjunction with counter-bore drivers in place of conventional 4-groove drills or standard twist drills.

The short length of cutter and counter-bore driver eliminates excessive overhang, giving increased rigidity for precision work. Extension sockets are available for use in combination with these tools for deep hole drilling.

F-102—Utility Storage Box

A materials handling utility storage box designed by North American Industries, Inc., Chicago, Ill., takes full advantage of all fork-lift tractors as well as conventional overhead cranes and hand-operated pallet bed trucks. The unit provides full four-side utility with truck lifting forks, battleship



North American four-side utility materials handling storage box.

NEW ★ PRODUCTS

For additional information please use coupon on page 52

bottom construction, self-positioning stacking lugs, lifting hooks on each of the four corners, lifetime steel construction of 12 gage hard temper steel, arc welded joints throughout, full 64 cu ft capacity, and an oversize of 4 ft long by 4 ft wide by 4 ft deep.

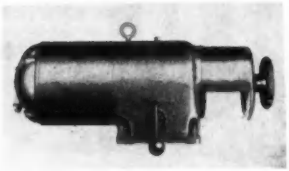
Typical uses are for storing and segregation of scrap metals, storage and shipment of raw and finished castings, and interplant storage and shipment of turnings, borings, chips, clippings and process scrap metals. The units are also used as furnace charging boxes in connection with rotating-face fork lift tractors.

F-103—Multispeed Gearshift Drive

The Lima Electric Motor Co., Lima, Ohio, announces a new multispeed gearshift drive identified as type R4, a self-contained unit designed to individually motorize machine tools formerly driven from lineshaft. It combines an integrally mounted motor and a four-speed transmission. Adaptable to many types of production equipment requiring selective speeds, the drive lends itself also to products of original equipment manufacture.

Features of the type R4 include a unit-cast gearbox, all helical heat-treated gears cut from steel forgings, precision-type bearings, and an oil reservoir equipped with magnetic drain plug to keep oil supply cleaner. Gearshift lever and shifting diagram showing speed ratios provide ease of speed selection. Full rated horsepower is delivered in every speed. Smooth plastic, safety-type handwheel is provided for inching the machine spindle, eliminating necessity of touching the belt.

The type R4 gearshift drive has these gear ratios—low, 4.00 to 1; second, 2.00 to 1; third, 1.33 to 1; high, 1.00 to 1. The units are built with four speeds in ratings of 3 (hp) at 900 rpm to 10 hp at 1800 rpm, with eight speeds in ratings of 1-½ hp at 1200/600 rpm to 5 hp at 1800/900 rpm—instantly reversible in all speeds by using a motor reversing control.



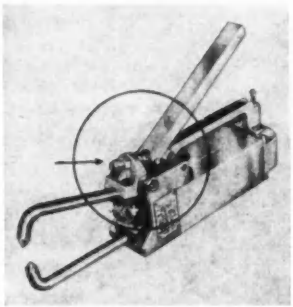
Lima multispeed gearshift drive, type R-4

Four-speed gearshift drives are furnished for operation on 2 or 3 phase, 25, 50, or 60 cycle, 220/440 or 550 volt a-c power supplies. Eight-speed drives are designed to operate on 3 phase, 50 or 60 cycles, 220, 440, or 550 volts a-c and can be supplied with either constant-torque or constant-hp motors.

F-104—Portable Spot Welder

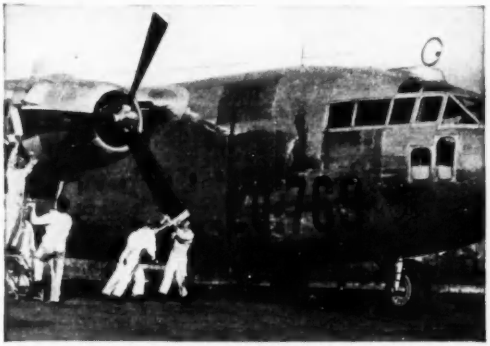
The Miller Electric Mfg. Co., Appleton, Wis., is putting out a redesigned, improved, portable spot welder with a new toggle-action tong lever. The new type toggle-action tong lever gives increased tong pressure for better spots and easy operation. The toggle-action lever assures sufficient hand pressure to pull the material together even if operated by women. The lever may be adjusted to either close tight on the work or to pivot past center and lock tight on the work. Thereby, the operator can close the welder on the material to be spotted, forcing it up tight and locking together, then operate the switch with the other hand. The design assures uniform pressure on every spot and is said to result in high quality welds not requiring "muscle."

An adjustment is provided between the lever and the tongs to compensate for various thicknesses of metal. At the rear of the handle another adjustment regulates the distance the handle closes. This new model spot welder may be used either with or without the timer control. A kit to provide the toggle-action tong lever action for older model portable spot welders is also available.

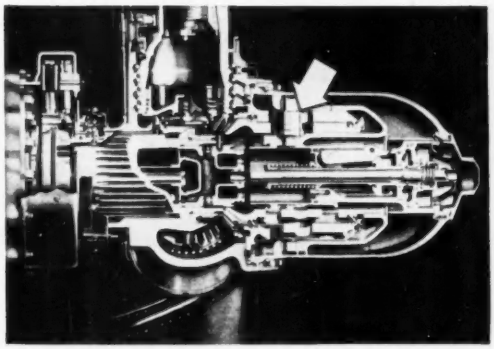


Miller portable spot welder with toggle-action tong lever

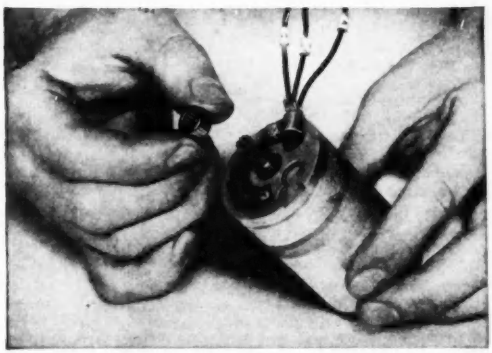
Torrington Needle Bearings provide maximum capacity in compact designs in Hamilton Standard propellers



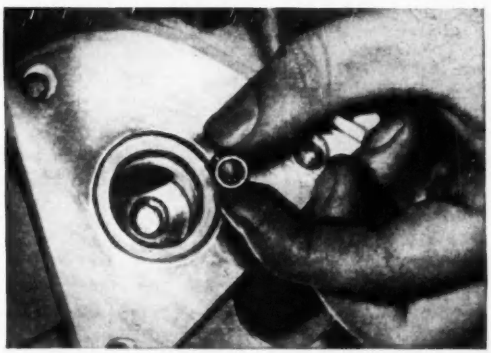
Propeller Synchronization and pitch change mechanisms must be compact, yet absolutely reliable. In several applications, Hamilton Standard Division of United Aircraft Corp. uses Torrington Needle Bearings to secure high capacity, anti-friction operation.



In Cam Roller Assemblies (arrow) of Hamilton Standard Hydromatic propellers, Needle Bearings reduce friction to a minimum. The full complement of Needle Rollers provides the high capacity necessary to carry the heavy loads involved.

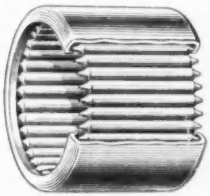


A Needle Bearing is also used on the drive shaft of an electric stepmotor. Here, the Needle Bearing reduces wear and helps to maintain proper mesh between the motor shaft and gearing in an electric head which controls operation of a Hamilton Standard Hydromatic propeller governor.



Space Limitations in this compact gear pump housing of a Hamilton Standard integral oil control assembly are easily met by Needle Bearings. With internal clearances accurately controlled in fabricating housings and shafts, this precision bearing insures close tolerance alignment of the motor pinion gear.

To secure smooth anti-friction operation in compact, high-capacity designs, use Torrington Needle Bearings. Our engineers will gladly lend a hand in design analysis and bearing selection. Write us today. THE TORRINGTON COMPANY, Torrington, Conn., or South Bend 21, Ind. District offices and distributors in principal cities of United States and Canada.



TORRINGTON *NEEDLE* **BEARINGS**

Needle • Spherical Roller • Tapered Roller **Straight Roller • Ball • Needle Rollers**

NEWS *of the* AUTOMOTIVE INDUSTRIES

(*Continued from page* 23)

First Flight for New USAF Trainer

The U. S. Air Force's newest trainer, the North American Aviation T-28, recently completed a 45 minute maiden flight two weeks ahead of schedule. First trainer designed and built since V-J day, the T-28 is tailored to train pilots for the advanced high speed fighters and bombers now in service with the Air Force.

New Prices of British Cars in U. S. and Canada

The following are some new English automobile prices announced since the devaluation of the pound:

Bentley, all-steel sedan	$ 9,450
Rolls Royce Silver Dawn (small Rolls Royce)	9,950
Rolls Royce Silver Wraith (big Rolls Royce)	13,995
Ford Anglia, price in Toronto	1,171
Ford Prefect, price in Toronto	1,244
Rootes U. S. A. prices	
Hillman Minx Sedan	1,495
Rootes Canadian Prices	
Hillman Minx IV Sedan	1,599
Humber Hawk Sedan	2,449
Humber Super Snipe Sedan	3,375
Humber Pullman Sedan	4,850
Sunbeam Talbot 90	2,597
Commer Light Van (Heaters, etc. extra)	1,467

Sloan Gives $1 Million for MIT Laboratory

Alfred P. Sloan, Jr., GM board chairman, has given $1 million to the Massachusetts Institute of Technology for a metals processing laboratory. During the past 30 years, Mr. Sloan has bestowed gifts amounting to $2 million on MIT.

Coventry Diesel Slashes Prices

Following the recent announcement of the devaluation of the pound, Coventry Victor Diesel engines have been reduced in price from about 25 to 48 per cent. The new list prices, FOB New York City, are listed below:

Model WD 1—Bare	$374
WD 2 "	439
Model WD 1—Tank Cooled	446
WD 2— "	506
Model WD 1—Radiator Cooled	502
WD 2— "	562
Model WD 1—Marine w/ Reduction	629
WD 2— "	676

Canadian Pipe Line Requires $800,000 Worth of Vehicles

An allocation of $800,000 has been made for motor trucks, tractors, bulldozers and other automotive equipment required in the forthcoming construction of the 1150-mi oil pipe-line, costing a total of $90 million, from Edmonton (Alberta), Canada, to the lakehead at Superior, Wis. Storage facilities will be built at the latter point for winter accumulation. During the seven months of Great Lakes navigation, a continuing service of tankers will deliver crude oil at Sarnia, Ont., for the refineries of southwestern Ontario.

National Machine & Broach Engineer Tours Europe

Ben F. Bregi, executive engineer for National Machine & Broach Co., is currently in Europe as technical representative of the American Gear Manufacturers Association and the National Machine Tool Builders Association. He will tour automotive machine tool and marine engine plants in Great Britain, France, Holland, Switzerland, Sweden, Italy and western Germany. He also will lecture before organizations of engineers and production men in the chief industrial centers of Europe.

GM Diesel-Electrics to be Built in Sweden

GM has signed an agreement with a Swedish firm for assembly and sale of Diesel electric locomotives in Scandinavia and overseas territory. Under the agreement signed with Nydqvist & Holm Aktiebolog, GM will supply 567B locomotive Diesel engines and transmission components, with the Swedish firm manufacturing some of the mechanical and electrical equipment.

Standard Products Transfers Newly-Acquired Machinery

Standard Products Co., Cleveland, maker of automotive locks and window channels, is transferring machinery of the recently purchased American Swiss Co., Toledo lock manufacturer, with the idea of integrating the business in Standard's Reid division operations in Cleveland. President Harry D. Myers of Standard reported the company plans to modernize its four manufacturing divisions.

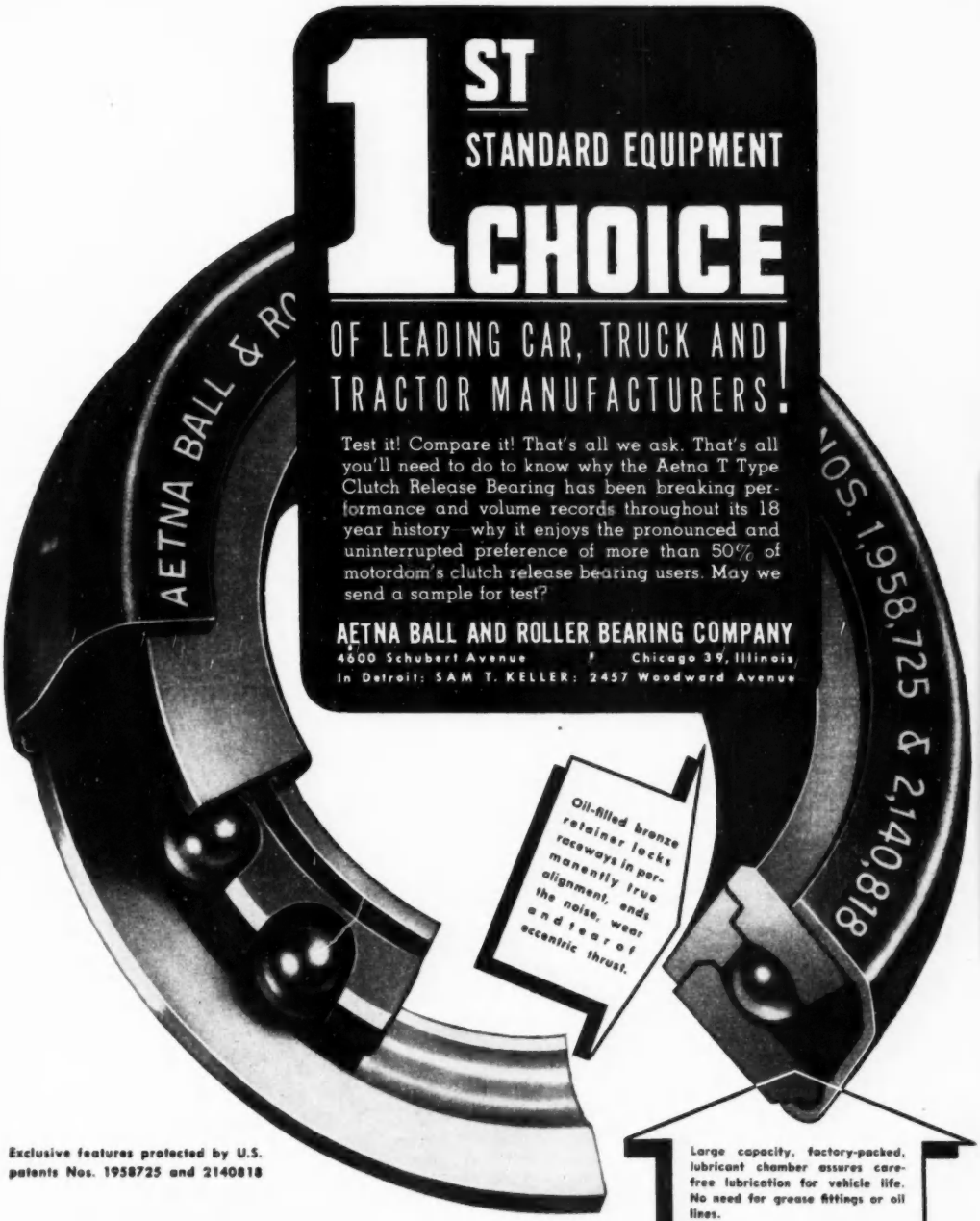
Canada Backing Gas Dynamic Combustion Research

At the behest of the Canadian Government and to further technological objectives of the Royal Canadian Air Force and the Dominion Dept. of National Defense, Dr. Donald Louis Mordell, associate professor of mechanical engineering at McGill University, Montreal, who designed and equipped a research and experimental laboratory for the organized study of combustion in gas dynamics at Ste. Anne de Bellevue, 20 miles west of Montreal, will continue indefinitely the investigation begun by him. It was stated that $100,000. would be expended annually in furtherance of the work. The purpose of the experimentation and research, heretofore privately financed, is to seek the cheapest and most efficient use, by combustion, of heavy and crude oils in operating motor cars, trucks, tractors, jet-propelled aircraft and home fuel burners, as well as railway locomotives. The chief interest is in combustion and the development of some research work on hydro-carbon combustion, relating primarily to the gas turbine engine.

CALENDAR

Conventions and Meetings

SAE Diesel Engine Mtg., St. Louis.Nov. 1-2
Amer. Society Body Engineers Annual Tech. Convention, Detroit.Nov. 2-4
SAE Fuels & Lubricants Mtg., St. Louis .....Nov. 3-4
Chicago Auto Show, Chicago.....Nov. 4-12
Chemical Industries Expos., New York City .....Nov. 28-Dec. 3
Amer. Soc. Mech. Engineers, Annual Mtg., New York.....Nov. 28-Dec. 2
Society for Experimental Stress Analysis Annual Mtg., New York, Nov. 30-Dec. 2
Nat'l Motor Boat Show, New York City .....Jan. 8-14
SAE Annual Mtg., Detroit.....Jan. 9-13
Plant Maintenance Show, Cleveland Jan. 16-19
Nat'l Auto. Dealers Assoc., Atlantic City .....Feb. 5-8
Nat'l Auto. Access. Mfrs. Assoc. Annual Expos., New York City. Feb. 6-10
Pacific Automotive Show, San Francisco .....Feb. 16-19
ASTM Spring Mtg., Pittsburgh Feb. 27-Mar. 3
Amer. Road Builder's Assoc., Cincinnati .....March 6-9
SAE-Passenger Car, Body & Production Mtg., Detroit .....Mar. 14-16
Geneva Motor Show, Geneva, Switzerland .....Mar. 16-26
Amer. Soc. Tool Engineers Industrial Expos., Phila .....April 10-14
Amer. Society Lubrication Engineers Convention, Detroit .....April 10-11-12
SAE Aeronautic & Aircraft Eng. Display, New York City.....April, 17-19
3rd Highway Transportation Congress, Washington .....Apr. 26-27
International Motor Show, Turin, Italy May 4-14
Mid West Automotive Show, Chicago .....May 11-14
Automotive Engine Rebuilders Assoc. Annual Convention, St. Louis.May 18-19
A.S.T.M. Annual Mtg., Atlantic City June 26-30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WITH THE... ...THAT TAMES TROUBLE

M. A. N. Diesel Development

(*Continued from page 33*)

Motor trucks had been manufactured by the Nuernberg plant of the firm since 1915, and after the first truck-type Diesel engine had been placed in production, some of the trucks were equipped with that engine. The Diesel trucks, in spite of certain early difficulties, on the whole proved so satisfactory that in 1932 the manufacture of trucks with gasoline engines was discontinued.

It is interesting to follow the development of the M.A.N. Diesel truck and bus engine through its various stages, up to the latest model, with a spherical combustion chamber in the piston, of which nothing has yet been published in this country, so far as we are aware. The first four-cylinder engine had a flat cylindrical combustion chamber (Fig. 1), into which fuel was injected by two open-type nozzles on opposite sides. The use of two nozles per cylinder did not prove entirely satisfactory, not only on account of the complication, but also because the injection quantity is very small in any case, and by the use of two nozzles the amount injected per nozzle is again divided by two. The next step (see Fig. 2) was an engine in 1927 with substantially the same form of combustion chamber, but the fuel was injected by a single, multiple-hole, vertical injector in the center of the cylinder head. To make room for the injector and at the same time ensure adequate breathing capacity, four valves were used, two inlet and two exhaust. The nozzles used in this engine were of the closed type. At first the inlet valves were provided with masks to generate a swirl in the combustion chamber, but these were found to be unnecessary and were later omitted. While M.A.N. had manufactured the injection equipment for the first engine itself, for this later model it adopted injection equipment made by specialists, Bosch and Deckel. These engines were produced successfully for several years, a six-cylinder model developing 110 hp with a minimum consumption of 0.40 lb per bhp-hr, and the consumption rose only slightly at higher speeds.

The desire for greater simplicity of construction and for freedom from the difficulties inherent in the very small orifices of the multiple-jet nozzle in 1932 led to the adoption of an air-chamber type of engine, as shown in Fig. 3. The combustion chamber was of conical form, in the cylinder head, inclined about 40 deg to the cylinder axis, and the nozzle was secured into the top of this chamber. An air chamber located to one side of the combustion chamber filled with air during the compression stroke, and discharged it during the power stroke, producing a strong blast at an angle to the fuel spray. It was realized from the beginning that with this type of head the fuel consumption would be somewhat higher, but it was also felt that the cold-starting qualities would be just as good. Engines of this type were developed to operate satisfactorily at 2400 rpm, and the type was chosen for the standard German military truck, which was produced by the whole industry.

It appears, however, that after this engine had been built for some years, its higher fuel consumption became a serious handicap, and the firm then developed its latest combustion system (see Fig. 4), in which practically the whole of the combustion chamber is in the form of a spherical cavity in the piston. Of all geometrical bodies the sphere has the least surface for a given volume, and this is equally important with respect to both fuel economy and easy cold starting. With engines of this type consumption figures of from 0.346-0.379 lb per bhp-hr are said to be obtained, which figures compare favorably with those for large Diesel engines.

With this construction the piston undoubtedly is slightly heavier than one without the combustion chamber, hence the inertia forces will be somewhat greater. But the difference is small and the resulting drawback is of little importance.

In developing its Diesel truck engine M.A.N. at first followed gasoline-engine practice, but as experience was gained many structural changes were made to better adapt the design to the peculiarities of the Diesel cycle. These need not be detailed here, because similar changes were made by other manufacturers of automotive Diesel engines. M.A.N. feels that at present the Diesel automotive engine has reached a higher state of development than the gasoline engine.

Unlike some other German manufacturers, the firm has made no attempt to produce a Diesel engine for passenger cars, but it is manufacturing a Diesel-engined farm tractor. An unusual feature of this rubber-tired tractor is that it has all-wheel drive.

U. N. Road Conference

(*Continued from page 44*)

European systems. For some time the Conference discussed the possibility of having two different protocols to cover the two main systems, leaving each contracting state free to adhere to whichever of the two it preferred. Finally, however, it was decided to have merely one protocol for the time being and to consider, after the passage of a few years, whether it would be possible to widen its application. The regulation of road signs was formulated as a separate protocol in order that it need in no way deter a state from ratification of the basic Convention on Road Traffic.

The System finally incorporated in the Protocol is aimed to bring about the use of the same colors and shapes in different countries to represent the same road conditions. All danger signals are triangular in shape, have a red border, and black symbols against a white or yellow background. Signs giving definite instructions have the same coloring, but are circular in shape. Other signs which are merely informative are generally rectangular in shape and the colors used must be such that red never predominates. Another feature of the system is that symbols are used wherever possible rather than letters or words, in order that the means of signs shall be clear to those not speaking the language of the country in which they are traveling.

The First article of the Protocol provides that contracting parties undertake to introduce the system as soon as possible, and to have it completely installed within ten years of the Protocol's coming into force.

The Protocol concerning Countries or Territories at Present Occupied is merely a short one, of one paragraph, relating to the possible accession to the Convention on Road Traffic, at the invitation of the Economic and Social Council, of countries or territories which are at present under occupation. In addition to summing up the work of the Conference and listing the delegations which took part, the Final Act also records certain other decisions of the Conference not written into the Convention or the Protocols. The Conference passed three separate resolutions, the text of which figures at the end of the Final Act. The First recommends that the United Nations take the necessary steps to enable the International Commission on Illumination to carry out certain tests, costing about 18,000 florins, which are necessary for the formulation of acceptable standards for motor car passing lights.

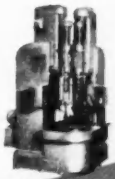
The Second requests the Secretary General to transmit to the Contracting States, at the latest three years after

(*Turn to page 62, please*)

Model 844
MICROFLAT

Model 705-2
HYDROHONER

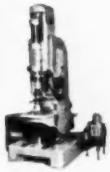
Model 720
HYDROHONER



Model 720-2
HYDROHONER

Model 721
HYDROHONER

Model 710-2
HYDROHONER



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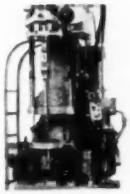
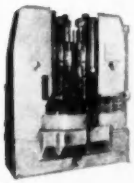
YOUR BEST MOVE *to cut your costs!*



GAGE BAR MICROSIZE
Single Spindle

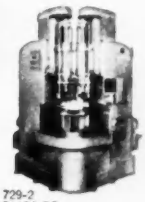


Model 726-3
HYDROHONER

Model 818
MICROFLAT

Model 718
HYDROHONER

GAGE BAR MICROSIZE
V-8 Multi-Spindle



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Our twenty years of honing progress have produced these machines which are cutting costs for many manufacturers. They can help cut your costs, too! Let's explore it!

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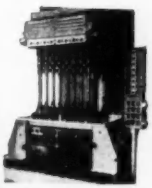
HYDROHONER

Model 844-2
MICROFLAT



GAGE BAR MICROSIZE
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the entry into force of the Convention, a statement of exactly which of the original or amended provisions of the Convention are in force for which Contracting States.

The Third recommends that the United Nations Transport and Communications Commissions review future progress and developments in the field of international road transport and advise the Economic and Social Council on what further international action is desirable.

Apart from these three resolutions, the Conference also decided that, in view of the fact that the new Convention was designed to supersede the 1943 Convention on the Regulation of Inter-American Automotive Traffic as well as the European conventions, there should be established by the Secretary General an authoritative Spanish translation of the text. Furthermore, while recognizing that it was not as yet possible to establish a worldwide, uniform system of road signs and signals, the Conference recommended that the Transport and Communications Commission be entrusted with the task of reviewing the situation and of advising the Council on the further steps which should be taken subsequently to reach worldwide agreement on a uniform system.

The respective instruments and the Final Act formulated by the Conference was signed by the United States and 27 other states; the Protocol on Road Signs and Signals by 14 states, except the USA. The Protocol on Occupied Territories was signed by the United States and 15 other states.

Ford-Mercury Transmission

(*Continued from page* 41)

Steel stampings and one aluminum die casting are used in the converter mechanism, which is encased in a cast aluminum housing for greater cooling efficiency. Through use of a ventilated housing, need for oil coolers or other heat exchangers is avoided.

Fuel economy with the new Mercury-Ford transmission is definitely better than with the regular three speed synchro-mesh transmission, according to Mr. Youngren, since the combination of torque converter with planetary gearing makes possible use of a lower axle ratio and lower engine speed, similar to that provided with overdrive. He added that no changes will be required in either the Ford or Mercury engines to accommodate the new transmission. Minor chassis modifications will be required, such as shortening the drive shaft and adjusting linkages. Total weight of the cars will be increased about 50 lb with use of the automatic transmission, he said.

Ease of servicing was given prime consideration in design of the transmission, Mr. Youngren said, with the result that all control elements are accessible simply by removing the single oil pan at the bottom of the unit.

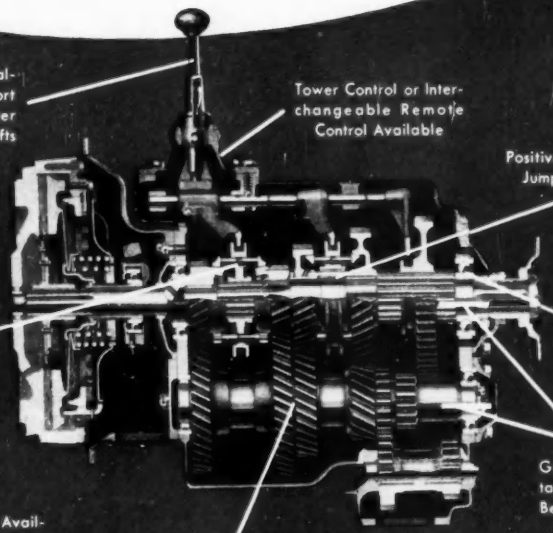
Ford has confirmed that it has signed a contract with Borg-Warner for production of the new transmission, but would not confirm the amount involved, reliably reported at about $25 million. Neither would the company indicate where it would center its production of the new units, but it appears a likely possibility that the recently acquired Kelsey-Hayes Wheel Co. plant at Monroe, Mich., might be used for that purpose. It is known that Ford is in favor of further decentralizing its activities, and the Monroe operation may well be the answer to where such a sizable production job will be placed.

Shaw Now Consultant for Solar Aircraft

Dr. L. I. Shaw, rocket engineer for the Bell Aircraft Corp. has resigned to become consultant engineer for the Solar Aircraft Co., San Diego, Calif. Dr. Shaw has been at Bell since April, 1948. Prior to that he was director of the Air Force jet propulsion project at Alfred University.

Spicer

ENGINEERING gives you these Exclusive Features in the Spicer Synchronized Transmission—



SPICER ENGINEERING produces Transmissions, Passenger Car Axles, Clutches, Parish Frames, Torque Converters, Stampings, Forgings, Universal Joints, Propeller Shafts, Spicer "Brown-Lipe" Gear Boxes, Railway Generator Drives.

Designing, Developing, Engineering, Manufacturing and Service

46 YEARS OF Spicer SERVICE

SPICER MANUFACTURING
Division of Dana Corporation
TOLEDO 1, OHIO

Uses of Powdered Metal Parts

(*Continued from page 27*)

and parts of every description for Chrysler Corp. products, the area of parts applications has been barely scratched and is said to offer some astonishing returns in physical properties as well as cost economy. An awareness of the possibilities of powder metallurgy is a must. Recent studies have shown that powder iron parts can be produced with load carrying capacity matching that of cast iron while advance research indicates the ability in the future to match the physical properties of alloy steels. Moreover, in the light of extensive work on jet engines and rockets it is of interest that parts made of nearly pure iron have a melting point approaching 2700 F.

Oilite parts of oil cushion (i.e., porous structure) type are currently produced in non-ferrous materials (bronzes and brasses of standard and special compositions, leaded bronze, copper, and aluminum); and ferrous compositions such as: iron, iron alloys, iron mixtures, and 18-8 stainless steel.

The potentialities of machined parts appear to be boundless, limited only by the imagination of the designer. One project placed in experimental production recently is a complete reduction gear box consisting of five powder iron gears.

Surprisingly enough even simple parts such as thrust washers and common spacers produced ordinarily from tubing with real economy in the accepted sense, can be made from powder parts at even lower costs, with considerably less handling, and with superior results.

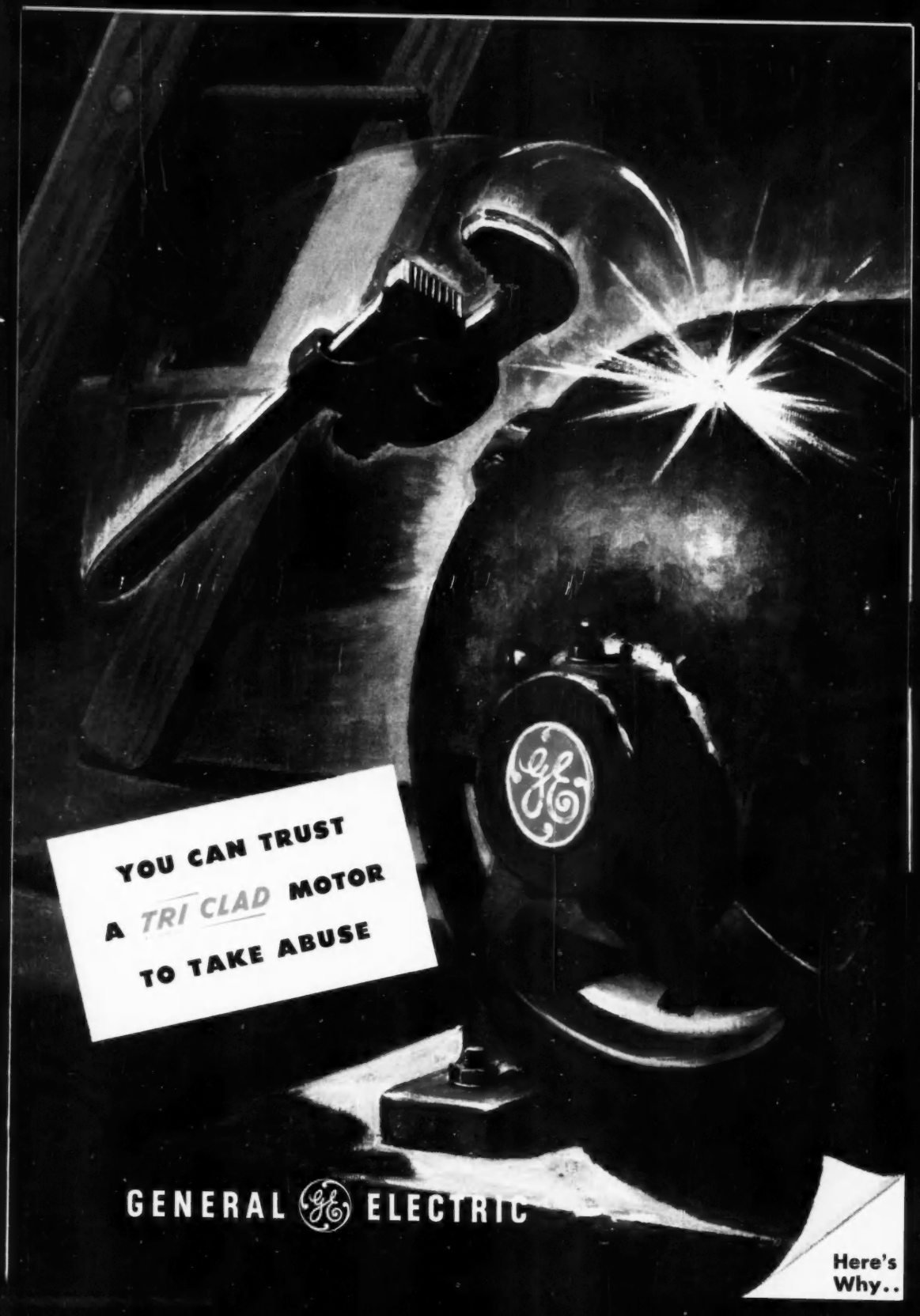
Complicated parts which require considerable machining by usual methods can be profitably replaced with powder metal parts at enormous savings in some instances. One ready example is that of a splined gear with irregular profile for which CRS stock and normal machining was considered. When relative costs were compared, it was found that the total cost of tooling for powder production was about $12,000 as compared with an investment of many times that amount for tools and machinery in a conventional set up. At the same time the cost per piece was reduced materially since no further machining was required.

An outstanding example of the evolution of an Oilite machined part having many distinct advantages is that of the piston used widely in direct-acting shock absorbers. During the war when materials were scarce an intensive search was made for substitute materials. The piston had been made successively from brass and cast iron. Then it was tried out in powdered iron. While iron solved the problem of material substitution, it was found upon completion of life tests that the iron part, because of superior self-lubricating qualities, was free from scoring and demonstrated amazing wear properties. Whereas the original type of piston showed wear from 0.008 to 0.011 in. on life tests, the Oilite part wore only by 0.0002 in. Relative wear in favor of the Oilite part was of the order of 40 times that of other materials.

This part, as illustrated, is quite intricate in form, requiring considerable screw machine work and the drilling of a large number of small holes in two concentric circles. The Oilite part, on the other hand, is formed to the desired dimensions and further improvement in technique already has been successful in coring one set of holes in the form of slots, promising to core all of the holes eventually.

Among the latest developments is the production of mating elements of the "L" rose type of gear used by Chrysler for oil pumps and other hydraulic pump applications; and a relatively

(*Turn to page 67, please*)


YOU CAN TRUST
A TRI CLAD MOTOR
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GENERAL ELECTRIC
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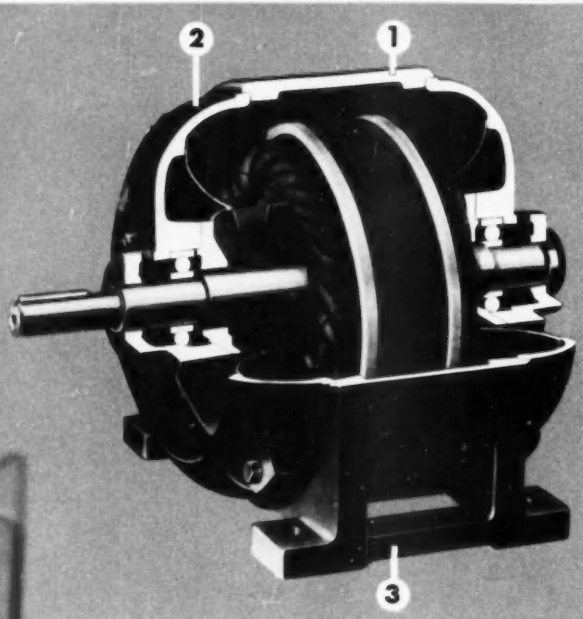
Why..



Notice the thick cross sections of a Tri-Clad's husky cast-iron stator frame (1) and end shields (2) . . . the integrally cast feet (3). Here you have a *rigid structural unity* that no other general purpose motor we've seen can match. Distortion of bearing alignment is well nigh impossible, even by severe blows, careless installation, or the heavy continuous radial loads some industrial drives impose. Notice, too, how Tri-Clad double-end ventilation provides *uniform* "air conditioning" throughout the motor.

You can trust a *TRI CLAD* motor to take abuse

Teeth-rattling blows – accidental jarring – dripping liquids – they're all in a day's work for a Tri-Clad motor – the toughest general-purpose motor that hard-headed plant management can buy.

The cast iron structure which today protects more than a million and a half Tri-Clad motors, is one big reason for its stamina. It absorbs the shock of accidental blows and falling objects encountered in rigorous industrial service. It provides vastly superior resistance to rust and corrosion. Moreover, cast iron won't take on an injurious permanent "set"; thus it assures accurate shaft alignment and a permanent air-gap for the life of the motor. Thick-ribbed cast-iron end shields, too, take more than their share of punishment.

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GENERAL ELECTRIC

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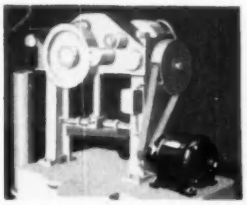
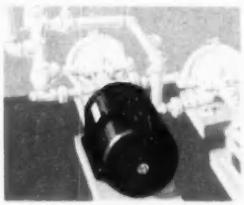
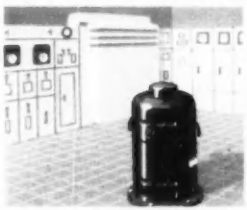


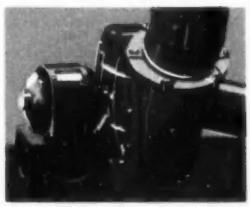
G-E open (drippproof) induction motors for constant-load, constant-speed applications. From 1 to 2000 hp.



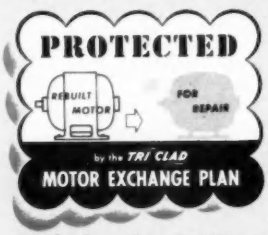
G-E totally enclosed motors for outdoor operation, in abrasive dusts, or corrative fumes. From 1 to 1000 hp.



G-E vertical induction motors for pump drive, in streamline design. From 1 to 500 hp.



G-E capacitor motors for use on fans, blowers, pumps and compressors, with single-phase power. From ¼ to 5 hp.



Look for this **EXTRA** on the motor you buy!

intricate window regulator gear having an exterior square boss and cored bores.

Parts of stainless steel are the latest additions to the Oilite line. For the time being most of these parts are being produced for government requirements. They are molded in the form of lobed cams with eccentrically located caged holes, in bushings, and other formations. One interesting result of current work with stainless steel is the knowledge that the oil cushion material has relatively free machining quality. It has been turned, threaded, knurled, milled, and drilled with facility.

An appreciation of the potentialities of powder metallurgy should make it possible for designers and production men to simplify the design of many parts and at the same time yield valuable cost economy.

Selective Hardening

(*Continued from page* 37)

operator inserts the plug into an outlet from one of the three timers, and each of the plugs is designed to fit only the proper timer for the specific magazine.

Other control devices are necessary to assure proper operation. For example provision must be made for stopping the machine and power circuit if movement of work is stopped. This is accomplished by a "zero speed" switch which is actuated by a large roller or disk between the tailstock of the inductor and the end of the trough on the right hand side. The disk is rotated by movement of the work and will automatically open the circuit if rotation stops.

Since high frequency induction machines of this kind are sensitive to variations in line voltage, a voltage regulator is installed in the 440 v power line so that there is only a narrow band of variation.

Finally, it is essential to control within close limits the temperature and pressure of the water line to the spray quench at the inductor block. This is done by means of a commercial water mixing valve in the plumbing for each machine. The mixing valve has a hot water line on one side and a cold water line on the other. Water temperature is held at approximately 100 F while line pressure is controlled between 25 and 30 psi.

Hot Milling

(*Continued from page* 31)

having desired properties at elevated temperatures, that is, they remain harder than the material they are cutting and can thus function as metal-cutting tools. Cutters must be designed for good chip flow and immediate ejection of the chip to avoid unnecessary accumulation of heat in the cutter.

Hot milling, or milling a workpiece whose surface layer has been softened by the application of heat, quite obviously is not indicated as a desirable machining method when other, more established, procedures prove expedient. Application of this technique is at present limited to operations that cannot be performed practically or economically by the more common methods.

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The foregoing article is from the paper, "Milling Hot Workpieces," which was presented by Messrs. Schmidt and Roubik at the American Society of Tool Engineers semi-annual convention Oct. 28 at Montreal, Can.

Business in Brief

Written by the Guaranty Trust Co., New York, Exclusively for AUTOMOTIVE INDUSTRIES.

General business activity declined sharply during the week ended Oct. 8. Department store sales, electric power production, railway freight loadings, and construction were lower than in the preceding week, while crude oil output and bituminous coal production advanced. The *New York Times* index of activity for the week ended Oct. 8 stands at 119.7, as compared with 134.8 in the preceding week and 116.2 a year ago.

Sales of department stores during the week ended Oct. 8, as reported by the Federal Reserve Board, equaled 297 per cent of the 1935-39 average, as compared with 302 in the week before. Sales were 12 per cent below the corresponding distribution a year ago, as against a preceding decline of eight per cent.

Electric power production declined contraseasonally during the week ended Oct. 8. The output was 0.7 per cent below the corresponding amount in 1948, as compared with an advance of 1.3 per cent shown for the preceding week.

Railway freight loadings during the same period totaled 574,228 cars, 12.7 per cent less than the figure for the week before and 35.6 per cent below the corresponding number recorded in 1948.

Production of bituminous coal and lignite during the same week is estimated at 2,210,000 net tons, 385,000 more than the output in the week before but 10,126,000 below the corresponding quantity in 1948.

Civil engineering construction volume reported for the week ended Oct. 13, according to *Engineering News-Record*, was $143,697,000, or six per cent less than the preceding weekly figure and 15 per cent below the comparable sum in 1948. The total recorded for 41 weeks of this year was 18 per cent more than the corresponding amount in 1948. Private construction for the period was 16 per cent above that a year ago, and public construction increased by 20 per cent.

The wholesale price index of the Bureau of Labor Statistics during the week ended Oct. 11, at 152.1 per cent of the 1926 average, was 0.1 per cent less than in the preceding week and 7.8 per cent below the corresponding figure in 1948. Declines were registered in all major commodity groups, with the exception of foods, textile products, and fuel and lighting materials, which increased, and metals and metal products, which showed no variation.

Member bank reserve balances decreased $268 million during the week ended Oct. 12. Underlying changes thus reflected include increases of $164 million in nonmember deposits and other Federal Reserve accounts and $70 million in money in circulation, accompanied by declines of $119 million in Reserve bank credit and $61 million in Treasury deposits with Federal Reserve banks.

Total loans and investments of reporting member banks increased $15 million during the week ended Oct. 5. An advance of $50 million in commercial, industrial, and agricultural loans was recorded. The sum of these business loans, $13,434 million, shows a net decrease of $1877 million in 12 months.

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And . . . the results of the A. R. F. study indicate that AUTOMOTIVE INDUSTRIES penetrates effectively the buying power of the $12 billion industrial automotive field. AUTOMOTIVE INDUSTRIES . . . the magazine of *proved* readership . . . reaches over 11,400 engineering, production and administrative executives in more than 3000 automotive manufacturing plants, America's most active industrial field.

AUTOMOTIVE INDUSTRIES

A CHILTON Publication

CHESTNUT AND 56th STREETS, PHILADELPHIA 39, PA.

. . . the Automotive Industrial News Magazine

Britain's Largest Automobile Show

(*Continued from page 26*)

members. To carry the front suspension, two vertical tubular pillars are welded to each side rail, united by a bridge piece. The pairs are linked by transverse tubes and stiffened by a diagonal tube rearward from the top of the bridge to the side rail. The independently sprung front wheels have their torsion bars parallel with the main frame member.

The rear axle is of the conventional type, with attachment to the chassis by two radius arms on each side. There is a heavy tubular cross member at the rear welded to a vertical and a diagonal member from the side rails. The two torsion bars for rear suspension are mounted immediately below the tubular cross frame member and each one is splined to the upper of the two radius arms.

A modification of the Jowett power plant is used. This is an opposed flat four of 91 1/3 cu in. piston displacement with light allow cylinders and crankcase, and an iron head. The cylinders have wet liners. Valves are vertical in the head, with pushrod and rocker operation. Compression ratio is 7.1 to 1 and maximum output is 60 hp at 4100 rpm. The radiator is mounted behind the engine, water circulation being by belt-driven pump.

With a wheelbase of 93 in., and a track of 49 in. rear and 51 in. front, the chassis weight is 1030 lb. Standard body is a two-passenger, two-door sports sedan, pontoon sided and with enclosed rear wheels. The Jowett-Era will go into immediate production, chassis price on the English market being $1386.

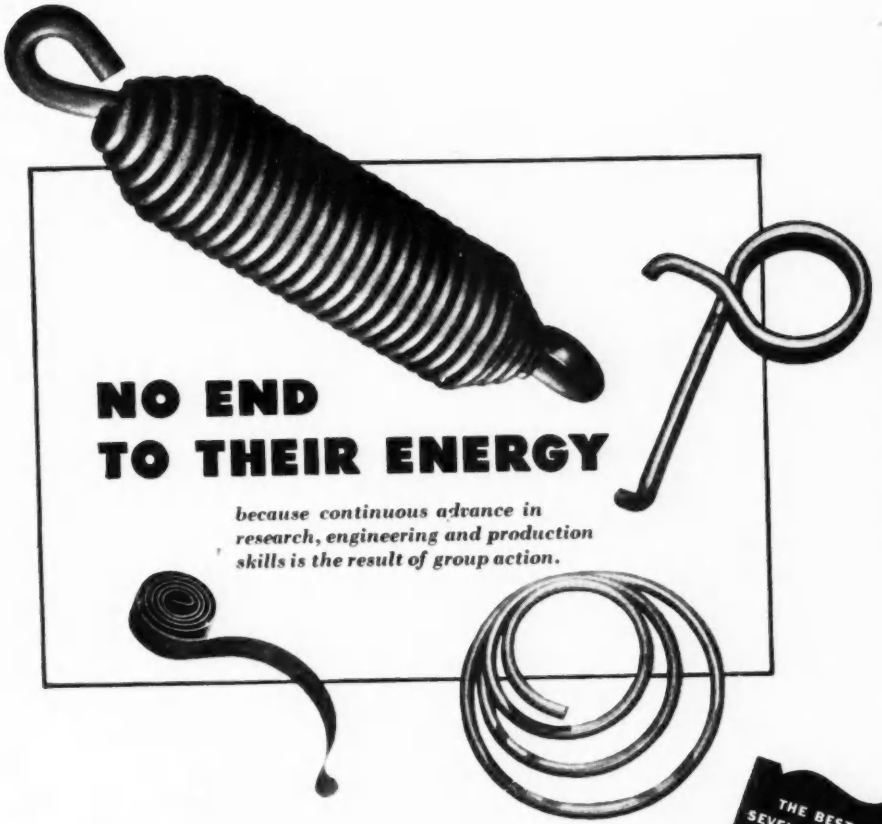
Standard waited until the morning of the show to uncover a new model, the Triumph Mayflower coming in the lower priced class. This is an 84-in. wheelbase car listed at $1036 on the English market, thus bringing it well below the price of the Vanguard produced by the parent Standard Co.

The Mayflower has a four cylinder, L-head engine of 2.44 by 3.94 in. bore and stroke, developing 38 hp at 4200 rpm. Compression ratio is 6.7 to 1. The head is in light alloy. A downdraft Zenith carburetor is fitted and water is circulated by a belt-driven pump. A 7¼ in. single plate clutch is fitted and the transmission, which is practically the same as that used on the Vanguard, provides three forward synchromeshed speeds, the high ratio being 5.125. An open drive shaft, with Spicer universals is fitted.

Front suspension is by support arms and coil springs, with shock absorbers mounted within the springs. Semi-elliptic springs are used at the rear. Lockheed brakes are fitted. The chassis frame is U-section, with the opening of the U covered by the welded-on body. Only one body style is provided, this being a two-door sedan of pronounced knife-edge design. Headlights are recessed in the front end of a tunnel, the only completely rounded portion of the car, and the grille follows the old Triumph radiator design. Complete weight of the car is 1900 lb.

The two Vauxhalls, which were entirely new last year, have undergone minor changes. These comprise the adoption of the Burman steering gear, of the worm and ball-bearing-mounted peg-follower type. Another steering change is the provision of single ball thrust bearings in the steering yokes, so that the weight of the car is supported on a ball and socket below each king pin. Headlights are bigger, and parking lights, flush with the fenders, are now separate.

(*Turn to page 72, please*)



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because continuous advance in research, engineering and production skills is the result of group action.

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AND CANADIAN AFFILIATE

A new job by Allard, one of the smaller manufacturers, is a two-passenger sports model embodying independent front suspension with coil springs all round, this being a change from the transverse leaf springs formerly employed. The chassis side rails are box section, united by steel tubes and three steel hoops used for body and hood attachment. The front end consists of two pivoted half axles with anchorage by long radius rods and inclined telescopic shock absorbers. At the rear a De Dion type axle is used, the differential housing being carried on the tubular rear cross member, with brake drums on each side of the housing. The power plant is a specal V-8 Ford engine giving 120 hp at 3800 rpm. All body panels are quick-detachable by the use of aircraft type Dzus fasteners.

Lea Francis has added a four cylinder engine of 152 cu in. piston displacement developing 95 hp at 4000 rpm. It is on the same general lines as the firm's smaller model, featuring two "high" camshafts operating inclined overhead valves through short pushrods. It has a single S.U. carburetor with water jacketed intake manifold. Camshaft drive is by chain, with a spring-loaded idler.

With the Silver Dawn Rolls Royce has produced a left-hand drive sport model with a gearshift lever under the steering wheel. Wheelbase has been reduced to 120 in. A feature of this car is that for the first time the body is also a Rolls Royce production, many of the light alloy panels being the same as those used for the Bentley. Mechanical changes are of a minor nature. Bentley exhibited a convertible with electric-hydraulic operation of top and windows.

Austin has added two new body types in the Atlantic sports sedan and a long wheelbase Sheerline limousine. The sports car is very similar to the convertible which was run at Indianapolis. It has a steel roof padded with cotton wool and covered with leather cloth, and has a curved windshield giving wide visibility. The limousine has the long wheelbase of 132 in. Because of this length the drive shaft is in two sections, with the center bearing carried in rubber on the cruciform frame member. Knife edge styling has been adopted.

There is a very strong line in open, sports, and convertible models, and it is in these that the most original work is to be seen. A very interesting example is a close-coupled four-passenger convertible by Jensen. The front treatment is simple and pleasing, with a practically oval-shaped opening for air, the lips of this being rounded and a plain straight bumper fitted. The rear portion of the fabric top is in rounded clear plastic and this, together with the canvas, disappears behind the rear seats when the top is lowered. On a pontoon-sided sports job Aston Martin makes use of the full width to carry the spare wheel vertically immediately behind the front wheel. On the opposite side, the portion of the body overhanging the frame is equipped as a tool and battery compartment.

There is a very general tendency to group instruments so that the most important are immediately in front of the driver and seen through the two- or three-spoke steering wheel. Fixed curved windshields are increasing in number. Some makers are fitting only two quarter bumpers at the rear, to protect the fenders.

Laminated torsion bars were shown by George Salter Ltd. While the idea is not entirely new, there have been no practical applications of these torsion bars. However, the Salter Co. claims that it has conducted considerable experimental work with their type and also that automobile manufacturers are carrying out tests with a view to its adoption.

Wellworthy Piston Co. showed examples of the Al-Fin bonding process as developed by Fairchild Engine and Airplane Corp. This is being used specially in England for bonding iron liners to light-alloy brake drums for racing purposes.

Electrolimit Height Gage transferring basic accuracy from P&W Precision Gage Blocks.

Electrolimit Internal Comparator, set up right at the machine, checking the finish ground hole of an automotive connecting rod.

Electrolimit Snap Gage checking automotive crankcase bearings . . . assuring perfectly matched assembly with similarly graded connecting rods.

3-Station Electrolimit Internal Comparator gaging I.D., squareness and concentricity of a refrigerator compressor part.

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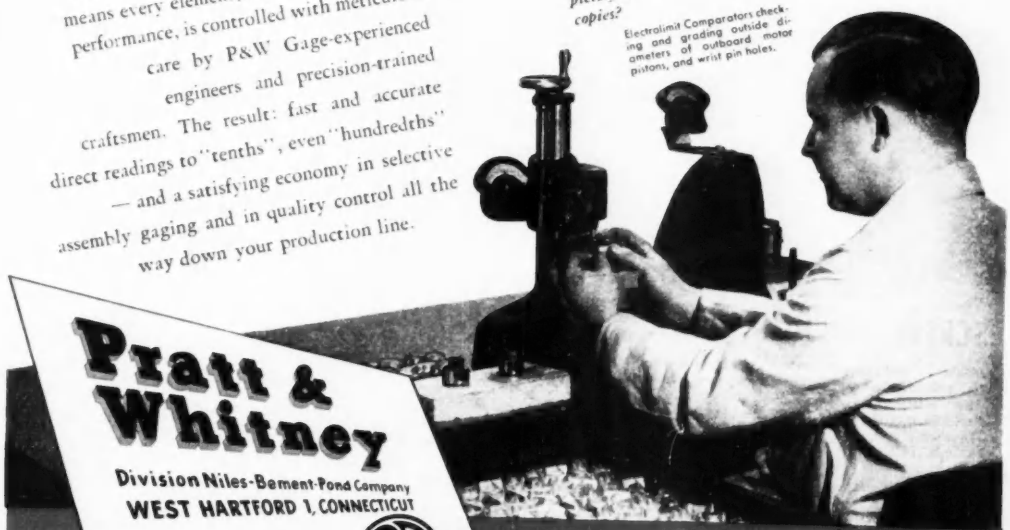
The complete story of P&W Electrolimit Comparators appears in these interesting and completely illustrated Bulletins. Shall we send copies?



Electrolimit Comparators checking and grading outside diameters of outboard motor pistons, and wrist pin holes.

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Grand Canyon

(*Continued from page* 39)

and the tire manufacturer.

A full supply of Mobilgas or Mobilgas Special (entrant's option) will be furnished each entrant by the General Petroleum Corp. at the starting point, free of charge, and whatever other quantities of gasoline are needed enroute. General Petroleum will also supply free a full crankcase of Mobiloil of an SAE number for winter operation as designated for such car on the Mobilubrication Disc Chart. Only Mobilgas or Mobilgas Special gasoline and Mobiloil may be used on the Run. Such fuels and oils will be regular stock products to which nothing may be added. All cars entered in the Run will be Mobilubricated free during the impounding period. If the entrant desires, he may have his own mechanic do the lubrication under the supervision of an AAA Contest Board observer. Only regular stock Mobil chassis lubricants, without adulteration, will be permitted and of weights and grades specified for that car.

All cooling systems will be drained and refilled during impounding period with a solution of 50 per cent Ethylene Glycol in water. This solution has a freezing point of approximately —30 F, and will be provided free of charge by the General Petroleum Corp. Any radiator covering may be used.

Cars will be impounded at General Petroleum's Crenshaw Center Mobil Service Station by 10 A.M., Monday, Jan. 23, 1950. From the time of impounding all cars will be checked for stock status. Entrants will provide their own mechanics and tools needed to assist the AAA Contest Board in dismantling and assembling cars. Cars may be taken from the impounding area and given two test runs not to exceed 75 mi each, if permission is secured from the AAA Contest Board. Entrants will not be credited with more than a total of 750 lb for driver, observer and passenger. If the total weight of driver, observer and passenger does not equal 750 lb, ballast will be added.

Each entrant will nominate an observer acceptable to the Contest Board of the AAA who will be designated by officials to ride in a competing car. Such observers must be paid employees of the entrant or an individual appointed by the AAA. One observer shall be assigned to a car and no person shall serve as an observer in any car in which he has a direct or an indirect interest or in a car of the entrant who appointed him.

When a competing car is traveling, the engine must be running and in gear at all times. Coasting by disengaging the clutch or gears will not be allowed. The foot of the driver must be free of the clutch pedal while the car is traveling.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, AND JULY 2, 1946

OF AUTOMOTIVE INDUSTRIES, published semi-monthly at Philadelphia 39, Pa., for October 1, 1949.

State of Pennsylvania } ss.
County of Philadelphia }

Before me, a Notary Public, in and for the State and county aforesaid, personally appeared James R. Custer, who, having been duly sworn according to law, deposes and says that he is the Editor of the AUTOMOTIVE INDUSTRIES and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily, weekly, semi-weekly or triweekly newspaper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the act of August 24, 1912, as amended by the acts of March 3, 1933, and July 2, 1946 (section 537, Postal Laws and Regulations), printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Chilton Company, Chestnut and 56th Sts., Philadelphia 39, Pa.; Editor, James R. Custer, 303-B Hampden Road, Upper Darby, Pa.; Managing Editor, None; Business Manager, G. C. Buzby, East Sunset Avenue, Chestnut Hill, Philadelphia 18, Pa.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) Chilton Company, Chestnut and 56th Sts., Philadelphia 39, Pa.

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3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown above is . (This information is required from daily, weekly, semiweekly, and triweekly newspapers only.)

JAMES R. CUSTER, *Editor.*

Sworn to and subscribed before me this 21st day of September, 1949.

PHILIP J. SHIRE, JR.

(My commission expires January 7, 1951.)

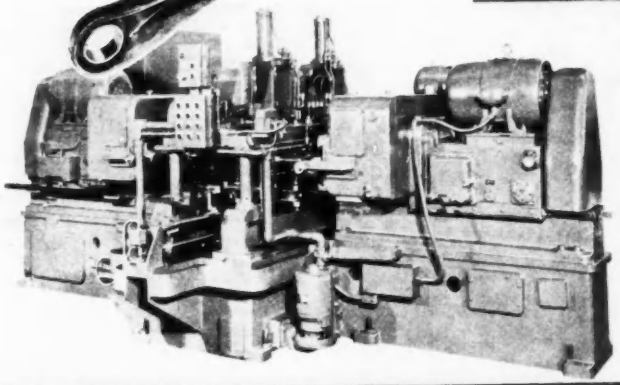
[SEAL]

KNEE-ACTION CONTROL ARMS

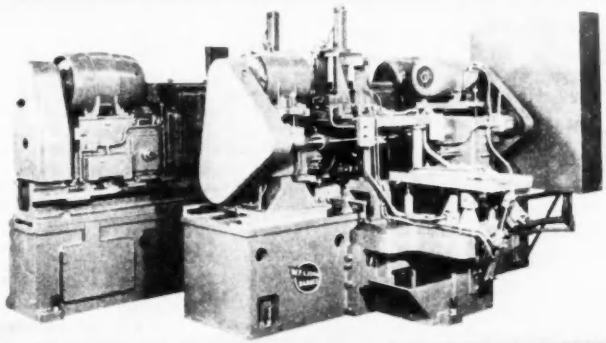
Machined automatically on

BARNES 4-Station PROGRESS-THRU MACHINE...

Automobile knee-action lower control arm showing angular holes to be machined.



Front view of Barnes Special 4-Station Progress-Thru Machine showing finishing station. Traverse cradle is in forward position ready for clamping workpieces.



Rear view showing automatic air-operated unloading mechanism. The two opposed lead screw-operated tapping units are shown in foreground.

Awkward Work Pieces Processed at Rate of 390 Per Hour

The automatic machining of these awkward, hard-to-handle steel weldments offer more proof of how the efficiency of special Barnes Progress-Thru machines are profitably applied to speed production and cut costs. At 85% efficiency, 390 pieces per hour are reamed, spot faced, chamfered, tapped, and unloaded automatically. An air-operated, tilting stripper bar saves handling time by ejecting the parts automatically at the unloading station.

Adjustable Features Permit Handling Both Right and Left Hand Parts

The work pieces are located in the machine from the contours at each end and side. An adjustable elevating mechanism, adjustable locators, and spindles with adjustable centers make possible the handling of both right and left-hand control arms on this one machine. Pick-off gear arrangements provide the necessary speed changes for each of the two reaming and spot-facing heads.

Ask for An Analysis of Your Machining Methods

Find out how Barnes Progress-Thru machines may be applied to cut costs in your shop. Ask for an analysis of your machining methods. There is no obligation.

Sequence of Automatic Cycle

1. Load.
2. Index part one station. Pushbutton initiates automatic cycle.
3. Parts are lifted vertically from the traverse cradles and clamped in position against rollers. Completed parts are simultaneously ejected at Station 4.
4. Machining heads move forward in automatic cycle of rapid approach, feed, dwell, rapid return, and stop. Tapping unit in Station 3 is lead screw operated.
5. Traverse cradles return to original position while machining is taking place. Ejector platform returns to horizontal position.

W. F. & JOHN BARNES

W. F. and JOHN BARNES

312 SOUTH WATER STREET • ROCKFORD, ILLINOIS, U.S.A.

Continental Truck Engine

(*Continued from page 40*)

cooling. Exhaust valve seat inserts are Stellite-faced and an unusual amount of water space as well as high metal strength are provided between valves. Water is brought down as close as possible to the valve seat, while particular attention is paid to water flow to obtain maximum heat dissipation in the valve seat and guide area, as well as around the spark plug. Push rods are carried through tubes on the outside of the head to simplify the casting and improve accessibility to the spark plugs.

Special attention has been given to valve gear design. The sodium-cooled austenitic steel exhaust valve has a Stellite seat and mounts in a long bronze guide. The tip end is equipped with valve rotator. The rocker arm has a ball and cup on the valve actuating end which contacts the rotator cap. All contacting surfaces are hardened and well lubricated so as to reduce wear to a minimum. The push rod end of the rocker arm has a spherical head adjusting screw which seats in the socket end of the tubular push rod. The lower spherical end of the push rod seats in the heat treated, Granoseal coated, barrel type tappet. Tappets run in sintered iron guides pressed into the crankcase. Intake valves are of Silchrome, running in iron guides. An oil guard is used to prevent excess oil splash on the stem. Dual valve springs are used.

In general, specifications of the engines are unchanged. Model T-6427 now develops 155 gross hp at 3000 rpm, an increase of four hp over the previous model which was rated at 151 hp at 2600 rpm. Maximum gross output of Model T-6371 has been upped to 138 hp at 3000 rpm from 132 hp at 2600 rpm; the increase in both cases resulting from improvements in design.

UN Completes Preliminary Int'l Car Treaty

The United Nations Road and Motor Transport Conference completed its preliminary work on a new world treaty on international movement of motor cars at a session in Geneva, Switzerland. The principal item in the new proposed treaty relate to identification of a vehicle and its driver, facilitation of customs procedure, a few basic safety rules, and certain technical requirements. Its scope is limited to the operation of private vehicles, excluding commercial bus and truck operations.

The treaty is applicable only to international traffic and does not affect domestic traffic. From the standpoint of the United States, the advantage of becoming a party to a treaty of this kind is that it will provide legal status for motorists and their vehicles when motoring abroad, and thereby facilitate their travel in foreign countries. At present such status is enjoyed by United States motorists in the Western Hemisphere, under a 1946 treaty.

Minor Strikes at Briggs Cost Million Manhours

Accumulative lost manhours total run up by a series of minor labor disputes at Briggs between Jan. 1 and Sept. 15 of this year was more than a million hours. It does not include losses of Briggs customers who were forced to suspend operation because of a stoppage at the supplier plant. According to the company, stoppages are caused by small irresponsible groups who do not follow contract procedure and grievance settlements.

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The Modern Method of Valve Actuation

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- Accurate Valve Timing and Perfect Seating at All Engine Speeds and Temperatures.
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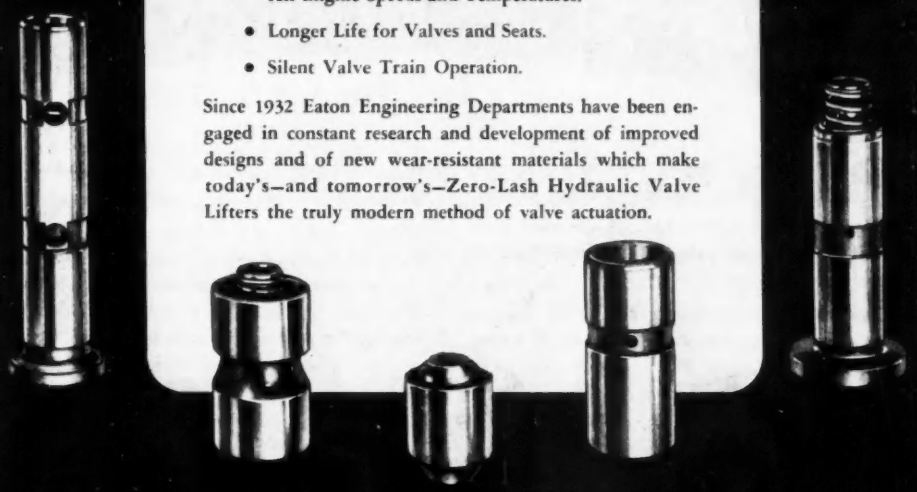

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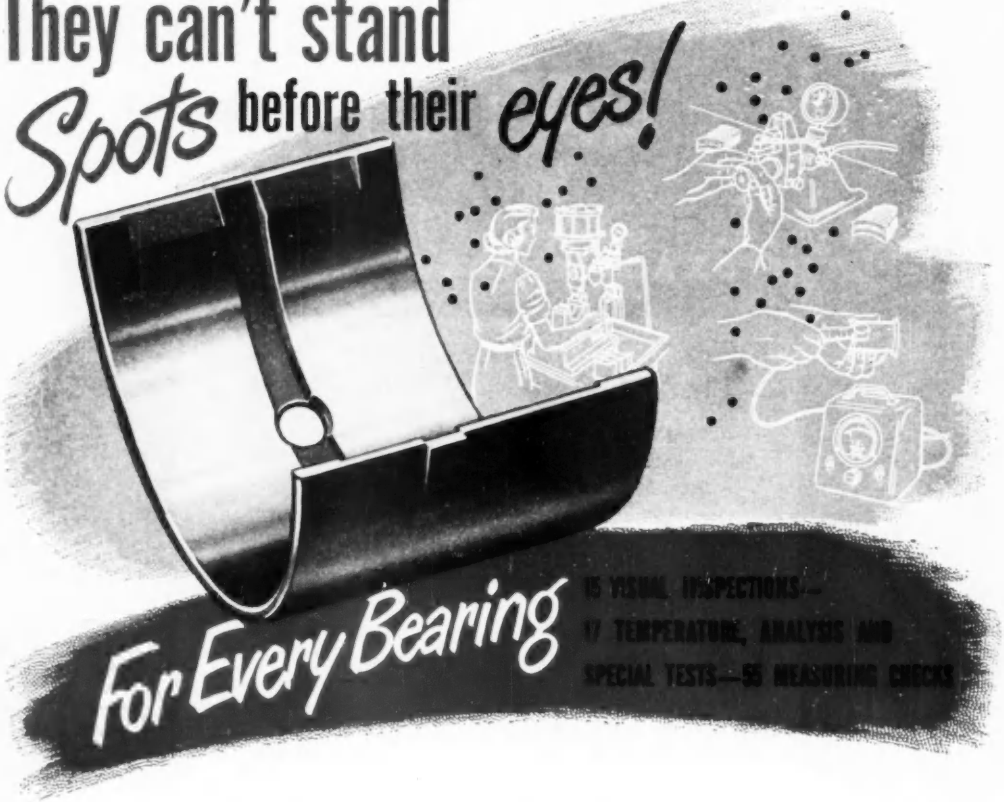

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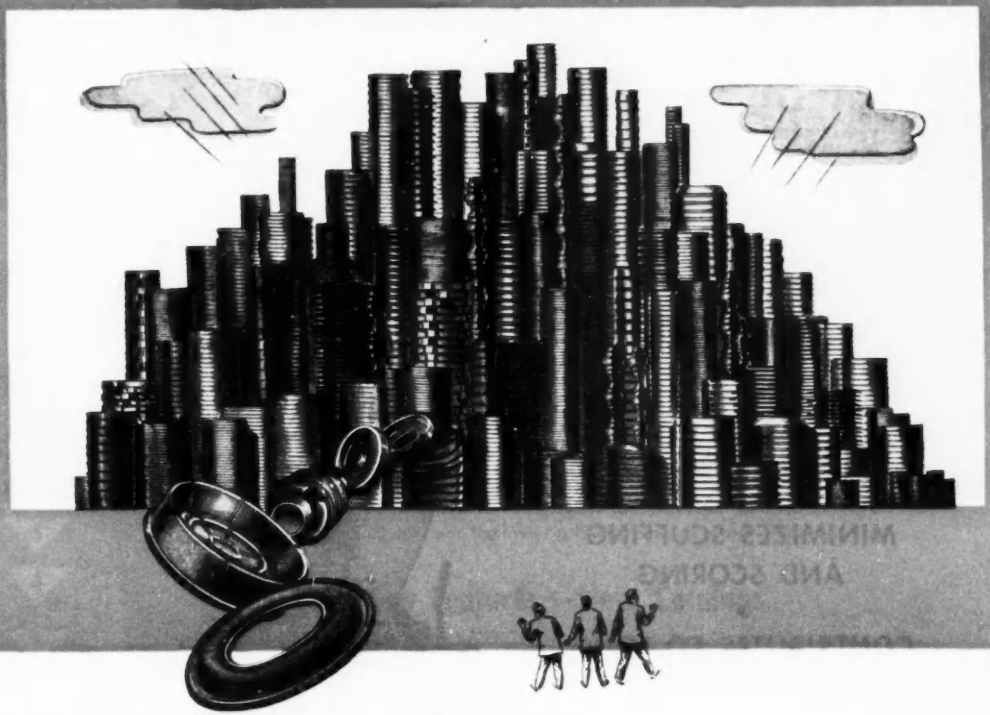

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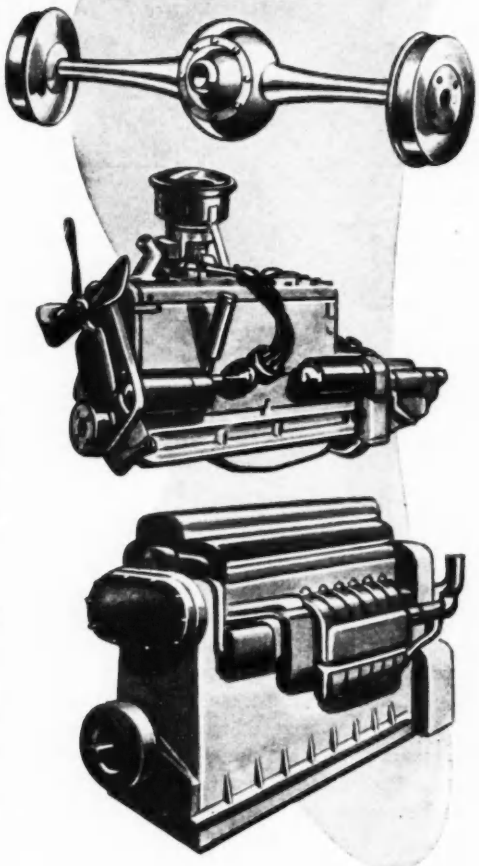

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MINIMIZES SCUFFING AND SCORING

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The first few hours of operation are crucial for friction surfaces. To protect the smooth surfaces and close fit of shafts, pistons, cylinders, gears and rods, leading manufacturers treat these parts with Parco Lubrite.

The Parco Lubrite coating, integral with the metal itself, is nonmetallic and oil absorbent. It holds lubricant, minimizes scoring and scuffing, aids greatly in the quick, smooth wearing-in of the surfaces.

The close, smooth seating, quickly attained by Parco Lubrite treated parts, contributes to the longer, more efficient life of assembly or engine.

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6. The Famous NORTON Wheel Spindle Unit
7. Space-Saver Ribbon Type Base Way Guards
8. Quick-Clean Coolant Ramp
9. Feather-Touch Work Jogging Lever
10. Finger-Tip Automatic or Manual Work Rotation Selector
11. Silky-Sure Hand Table Traverse
12. Quick-Action Pre-Set Truing and Grinding Speed Control
13. Either-End Table Dwell Control
14. No-Search "Click-Count" Wheel Feed Mechanism
15. "One-Lever" Grinding Cycle Control for Semi-automatics
16. Instant-Action Automatic Feed Rate Controls
17. Knee-High Hydraulic and Lubricating Pump Mounting

Compare Them With Your Present Equipment

Here are 17 of the reasons why you'll like the new Norton line of 6" and 10" cylindrical grinders—17 features that give new ease of operation and new ease of maintenance.

Compare these features with your present equipment. You will see how new efficiencies can be achieved with Norton CTU's that will give you the lower grinding costs so essential today.

New Features—New Catalogs

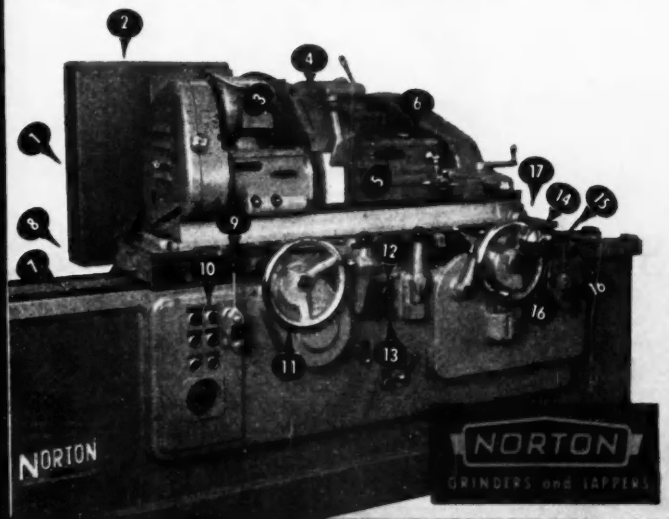
The outstanding features of these new Norton Grinders are graphically illustrated and described in a new series of catalogs. Write for any or all—no obligation.

Catalog 157-2—Norton 6" Type CTU Cylindrical Grinders.

Catalog 1488-1—Norton 6" Type CTU Semiautomatic Cylindrical Grinders.

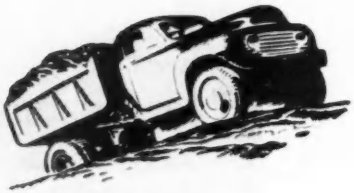
Catalog 166-2—Norton 10" Type CTU Cylindrical Grinders.

Catalog 1787-1—Norton 10" Type CTU Semiautomatic Cylindrical Grinders.



NORTON COMPANY, WORCESTER 6, MASS. - New York - Chicago - Detroit - Cleveland - Hartford - Distributors in All Principal Cities

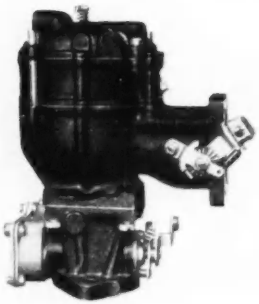
Abrasives - Grinding Wheels - Grinding and Lapping Machines - Refractories - Porous Mediums - Non-slip Floors - Norbide Products - Labeling Machines



Because Heavy Duty Carburetion is a Specialized Job . . .

Zenith

is the Engineers' Choice!



The year-in, year-out preference of engineers for Zenith* points up one outstanding fact—that *heavy duty carburetion is a specialized job.* For these experienced engineers know that Zenith is not a jack-of-all-trades, but is, instead, a master in its particular field—a master of fuel economy, of general efficiency, and of consistently dependable and trouble-free operation. For *your* heavy duty equipment, insist on Zenith—the Engineers' choice for consistently top notch performance.

*REG. U.S. PAT. OFF.

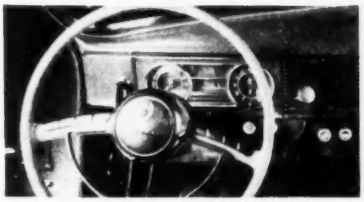
ZENITH CARBURETOR DIVISION OF
696 Hart Avenue • Detroit 14, Michigan
Bendix AVIATION CORPORATION

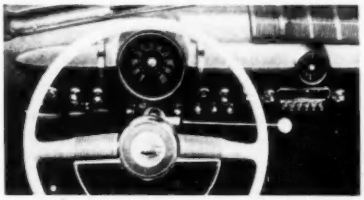
MANUFACTURERS OF FINE CARBURETORS AND FUEL FILTERS

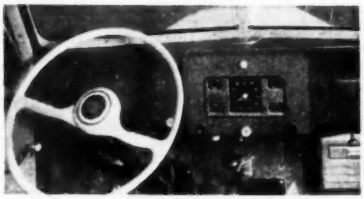
FIVE of the REASONS

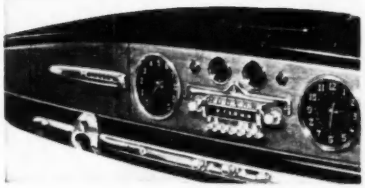
for the Superiority of

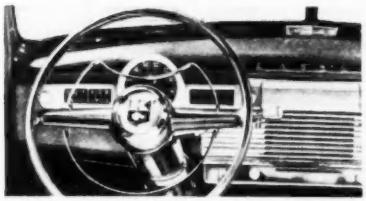
KS **DASHBOARD INSTRUMENTS**











King-Seeley electric dashboard instruments have long been superior in the automotive field because:

1. Their performance is always reliable—gives the car owner no cause for a gripe.

2. All connections are made with standard electric wire, thus they are easily installed by production line methods.

3. No tubing is needed. Wires are used instead. Consequently the danger and annoyance of broken tubes are eliminated. No tubing holes in the dash. Engine noises cannot be telegraphed to the dash as they are by tubing.

4. The vehicle manufacturer can always depend on strict adherence to the delivery schedules of King-Seeley instruments.

5. King-Seeley research engineers are constantly searching for a way to improve the effectiveness, dependability, and economy of these instruments.

In the last seventeen years 50,000,000 K-S instruments have been installed in automobiles and trucks. For more detailed information, write to King-Seeley or ask for a representative to call.

KING-SEELEY CORPORATION
ANN ARBOR, MICHIGAN
PLANTS AT ANN ARBOR, SCIO, AND YPSILANTI

M=PT ... BASIC FORMULA FOR AUTOMOTIVE ENGINEERS

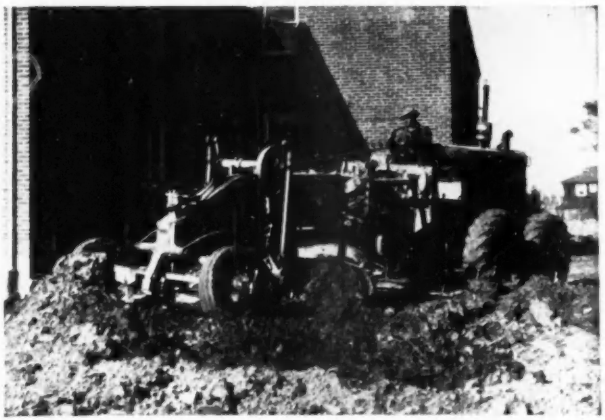
To solve a problem concerning power transmission, apply the formula M = PT (Morse means Power Transmission) and you'll find . . .

1. That Morse Roller Chains and Sprockets are most *easily adaptable* to your specific design needs.

2. That Morse Roller Chain Drives have *extra-long service life* because every phase of their manufacture and assembly is under rigid quality control and precision engineering supervision.

3. That Morse Roller Chain maintenance is *extremely low* due to the use of the finest quality materials in their manufacture.

4. That Morse Roller Chain Drives are *quickly obtainable* from shelf stock. *Ask the Morse Man* from any of the hundred Morse Branch Offices and Distributors. Each is staffed with engineers experienced in every mechanical power-transmission application.



Shaving the face of the earth with a Gargantuan blade is a job that calls for the best and most rugged in power transmission equipment—Morse Roller Chains and Sprockets!

Why Morse Roller Chain Drives Are Specified For The World's Toughest Jobs

For the world's biggest and toughest earth-moving jobs, many road graders and 'dozers now use Morse Roller Chains to transmit power to forward and rear drive wheels. Precision-made, positive-acting Morse Roller Chain Drives are the design engineer's favorite method of transmitting power where *dependability* and long, rugged *service life* come first! When your design calls for roller chain . . . call the nearest Morse Man!

Exploded View of Morse Roller Chain Shows Why It's Specified By Design Engineers

Morse Roller Chains are made in all standard pitches and widths in accordance with specifications approved by the American Standards Association to assure complete interchangeability with all other standard roller chains and sprockets.

ASK the Morse Man nearest you . . . today!

From coast to coast there are more than 100 offices, representatives and distributors of Morse Power Transmission products to give you quick information and service when you want it—where you want it. *Ask the Morse Man first in any case!* Check your classified phone directory under "Power Transmission" or "Chains."

A Morse Roller Chain pins are made from special, high-nickel, fine-grain alloy steel. They are heat-treated and finished for extra strength and extreme resistance to wear.

B Bushings are curled from high-quality alloy steel to give the smoothest possible O.D. and I.D. Smooth inner surface and true roundness eliminates scoring of pins and results in longer life. Bushings are case-hardened.

C Rollers are heat-treated for toughness to provide maximum strength and the greatest possible resilience to shock.

D Plates are heat-treated for structural strength and endurance. Apertures are accurately pierced and sized to provide rigid retention of pins and bushings through proper press fits.

Morse *means* Power Transmission


Morse Roller Chain Couplings

Morse Silent Chain Couplings


Morse Morflex Couplings


Morse Morflex Radial Couplings


Morse Morflex Drive Shafts


Morse-Formsprag Clutches


Morse-Rockford Clutches


Morse-Rockford Pullmore Clutches

MORSE

MECHANICAL
POWER TRANSMISSION
PRODUCTS

PRODUCTS OF B-W BORG-WARNER

Morse Chain Company
7601 Central Avenue, Dept. 450
Detroit 8, Michigan

Gentlemen:
Please send me latest technical data and specifications on:

- ☐ Roller Chains and Sprockets
- ☐ Morse Silent and Roller Chain Couplings
- ☐ Morse-Formsprag Clutches
- ☐ Silent Chains and Sprockets
- ☐ Morflex Couplings
- ☐ Morse-Rockford Clutches
- ☐ Pullmore Clutches
- ☐ Have representative call

Name _____

Title _____

Company _____

Address _____

City _____ **Zone** ____ **State** _____

"Clean As A Whistle"
TO MAKE and TO USE

...and you can say that of any vac built with American Phillips Screws

CLEANER PRODUCTION: No scarred parts, no slashed hands, no floors littered by fumbled screws. For when an American Phillips Screw is put on the point of its 4-winged driver . . . then they become one straightline unit until the recessed screwhead is turned up flush and tight . . . the *first* time, *every* time. Saves rejects, saves screws, *saves time up to 50% over out-of-date slotted screws.*

CLEANER SALES: Buyers of modern, top-quality products know the buy-sign of the universal Phillips crossed recess on everything from their automobiles to their golf clubs. To them, the Phillips recess means that when a product is so put together, *it stays put.* To you, it means fewer returns and fewer free servicings, especially where vibration is involved. So remember, from both viewpoints . . . production and sales . . . *American Phillips Screws always cost least to use.*

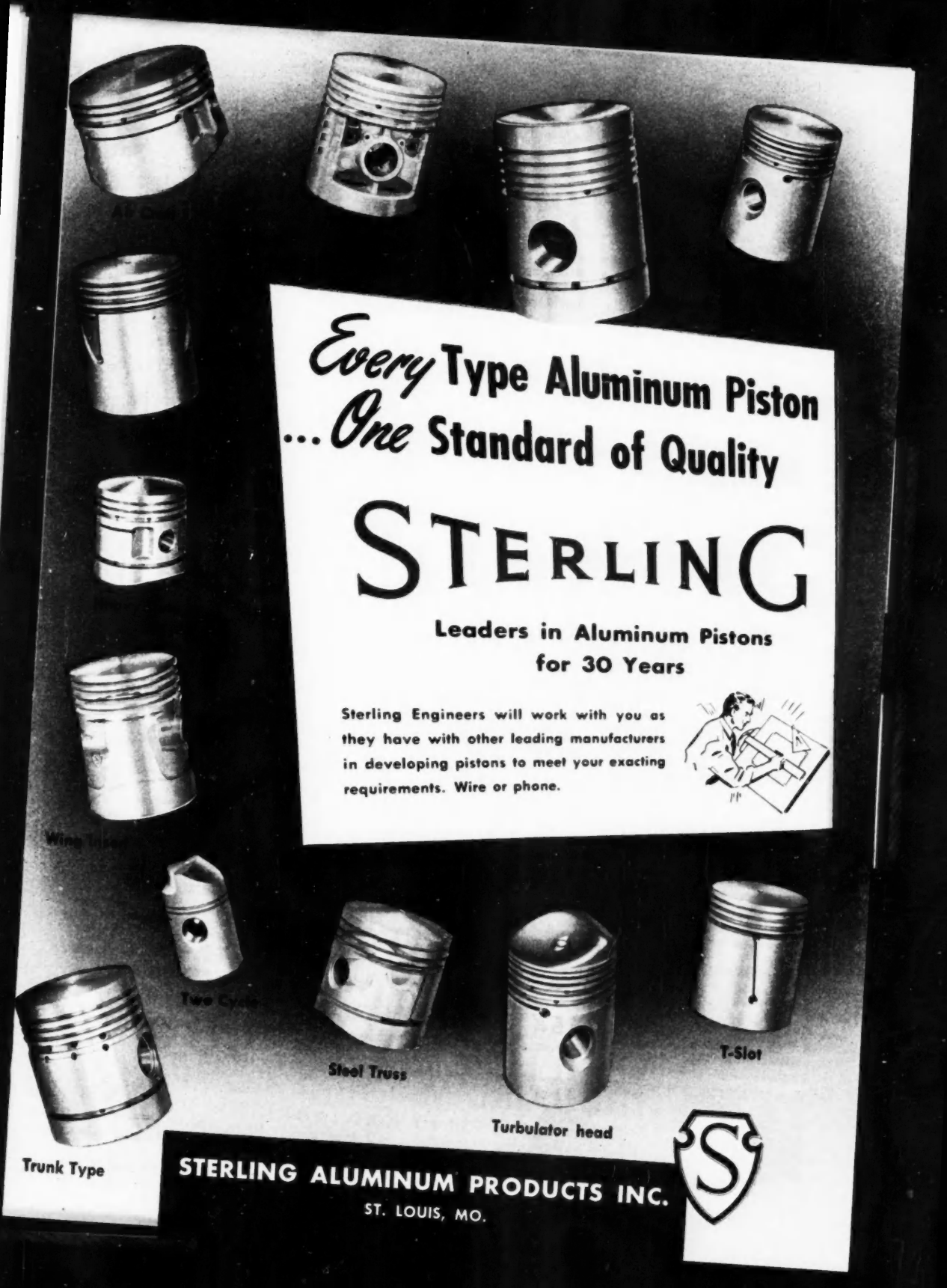
AMERICAN SCREW COMPANY, PROVIDENCE 1, RHODE ISLAND

Chicago 11: 589 E. Illinois St. Norristown, Pa. *Detroit 2:* 502 Stephenson Building

AMERICAN PHILLIPS *Screws*

ALL TYPES

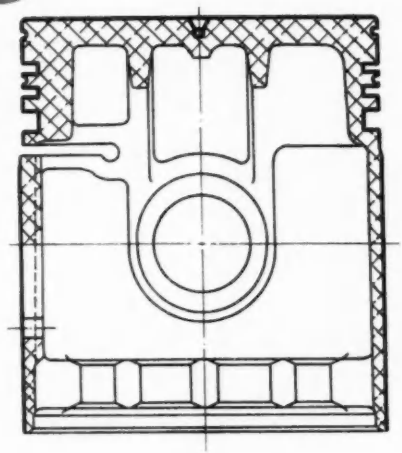
ALL METALS: Steel, Brass, Bronze, Stainless Steel, Aluminum, Monel, Everdur (silicon bronze)


Every Type Aluminum Piston
... One Standard of Quality
STERLING
Leaders in Aluminum Pistons
for 30 Years
Sterling Engineers will work with you as they have with other leading manufacturers in developing pistons to meet your exacting requirements. Wire or phone.
Two Cycle
Steel Truss
Turbulator head
T-Slot
Trunk Type
STERLING ALUMINUM PRODUCTS INC.
ST. LOUIS, MO.

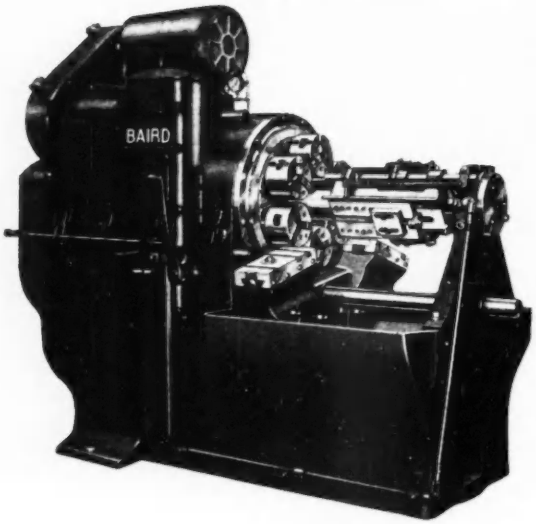
Elliptical TURNING

The mechanical drawing opposite is of a 3 5/16" by 3¾" long aluminum alloy piston. It was held in a mechanically operated expanding pin type chuck and centered on a previously finished land, inside the skirt of the piston.

The piston was rough and finish turned at the skirt end; elliptical O.D.; DOME and 5 grooves and dome centered and grooves chamfered.



243 per hour



BAIRD

No. 76 H *Automatic* CHUCKER

Some Exclusive Features:

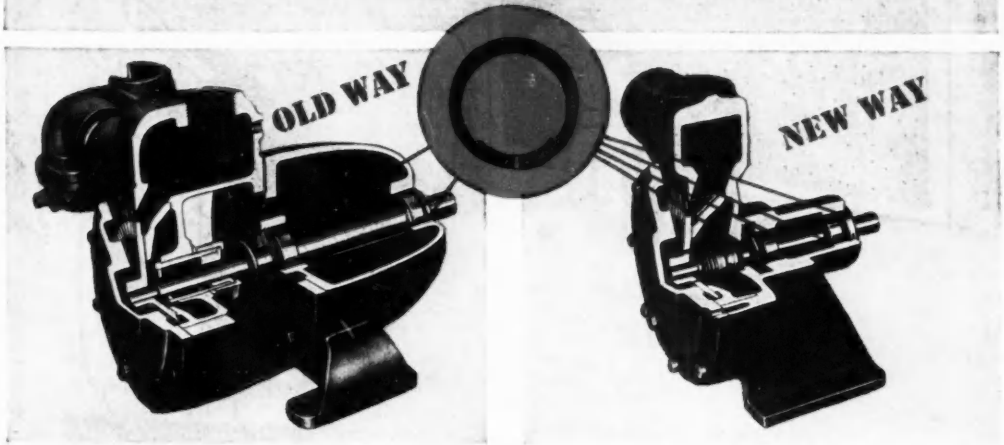
- **INDEPENDENT TOOL SLIDES**
  The longitudinal tool slides may have different strokes and the cross slides are independent and have their strokes, all as best suits the job. All tool slides have micrometer adjustment.
- **DIFFERENT SPEEDS AT SPINDLES**
  Ability to choose a speed for the spindle at each work station to suit the operation to be performed at that station permits the best product in least time.
- **AUTOMATIC CHUCKING**
  Operator has both hands free to handle the work. No levers or handles to require his attention or take his time.
- **ATTACHMENTS**
  Several readily applied attachments are available to perform extra operations and reduce handling, thus speeding production.
- **AUTOMATIC MECHANICAL STOP**
  Stops machine at end of each cycle if operator has not unloaded and reloaded in the proper operation of machine. This and other safety features make for least loss due to damage and for greatest safety.

"ASK BAIRD ABOUT IT"

OTHER BAIRD MACHINES: MULTIPLE SPINDLE GRINDERS, WIRE FORMING MACHINES, PRESSES, TUMBLING EQUIPMENT

THE BAIRD MACHINE COMPANY
STRATFORD, CONN.

REDESIGN TRIMS LENGTH 5¼ INCHES, CUTS UNIT COST $5.70



Series D Wayne water pump uses machined shoulders to position bearings on shaft. 2 Truarc rings hold bearings in housing. Locknut holds screw-type stuffing box that requires periodic tightening.

New design uses 4 Truarc Inverted rings (2 external, 2 internal) to position shaft, retain bearings. Inverted rings provide shoulders of uniform section height. 1 Standard ring secures maintenance-free mechanical seal.

Redesign with Truarc Rings helps save $5.70 per unit for Wayne Home Equipment Company, Inc., Fort Wayne, Ind. It gives them a more compact product, eliminates a separate bearing pedestal and a skilled-labor grinding operation. It facilitates use of maintenance-free mechanical seal instead of old type stuffing box.

Redesign with Truarc Rings and you too will cut costs. Wherever you use machined shoulders, nuts, bolts, snap rings, cotter pins, there's a Truarc Ring that does a better job of holding parts together.

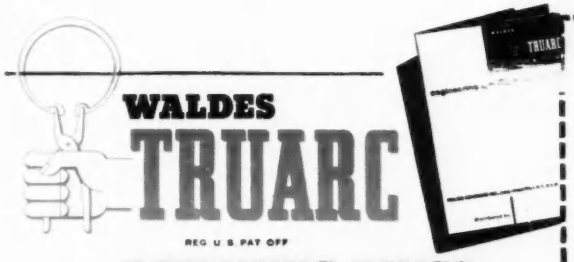
Truarc Rings are precision engineered. Quick and easy to assemble, disassemble. Always circular to give a never-failing grip. They can be used over and over again.

Find out what Truarc Rings can do for you. Send your blueprints to Waldes Truarc engineers for individual attention, without obligation.

REDESIGN WITH 5 TRUARC RINGS GIVES THESE BIG SAVINGS

- *Cuts length 5¼ inches*
- *Cuts total labor 15.3%*
- *Eliminates skilled-labor grinding operation*
- *Saves 38.3% materials*
- *Allows use of stock-size shaft, smaller bearings*
- *Eliminates separate bearing pedestal*

TOTAL UNIT SAVING . . . $5.70



WALDES TRUARC

REG U S PAT OFF

RETAINING RINGS

WALDES KOHINOOR, INC., LONG ISLAND CITY 1, NEW YORK

WALDES TRUARC RETAINING RINGS ARE PROTECTED BY U. S. PATS. 2,302,940; 2,402,454; 2,416,852 AND OTHER PATS. PEND.

Waldes Kohinoor, Inc., 47-16 Austel Place AY-111
Long Island City 1, N. Y.

Please send 28-page Data Book on Waldes Truarc Retaining Rings.

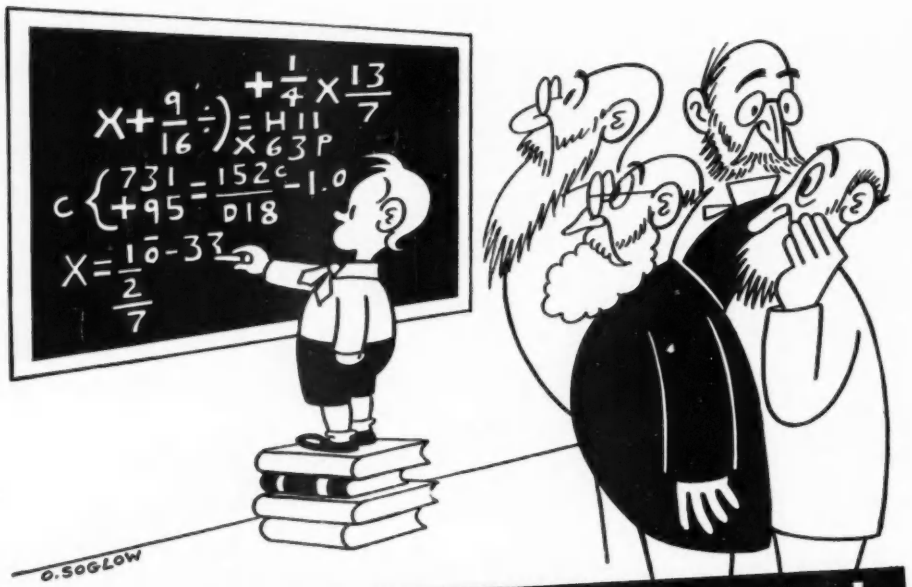
Name_____

Title_____

Company_____

Business Address_____

City_____ Zone_____ State_____ ★



You'll be surprised at these figures!

- 80 million Americans own $48 billion of U. S. Savings Bonds.
- 20,000 of the nation's 38,000 firms employing 100 or more persons are operating Payroll Savings Plans.
- 7,500,000 workers are buying an individual average of $20 of Bonds per month.
- For the year 1948, sales of Series E Bonds exceeded redemptions by $495,148,000. The net figure for all Series after redemptions and maturities was $2,151,140,000.

What does all this mean to you? Well, it means first of all that your Treasury Department is successful in its program of increasing the nation's economic security by spreading the national debt. Secondly it means that most of the nation's business leaders recognize the value of the Payroll Savings Plan sufficiently to promote it within their companies.

For example...

To give you some idea of the Plan's growing popularity: 80,384 employees of a prominent electrical manufacturing company were investing in Bonds at the rate of $30,005,270 as of the end of 1948. This is a gain of nearly 100% over 1947, when 45,000 employees participated in that company. The treasurer of a well-known shoe company reported that, of his concern's 19,060 employees, 9,240 were in the Plan and had invested $146,807.32 in Bonds via deductions during the preceding month.

Why promote it?

We all know how buying Bonds builds an individual's future security. But there are *company* benefits too! Nation-wide experience shows that Payroll Savings increases each participating employee's peace of mind—makes him a more contented, more productive worker. It reduces absenteeism, lowers accident rates, increases output, and improves employee-employer relations.

It's easy to boost participation

1. See that a top management man sponsors the Plan.

2. Secure the help of the employee organizations in promoting it.

3. Adequately use posters and leaflets and run stories and editorials in company publications to inform employees of the Plan's benefits to them.

4. Make a person-to-person canvass, once a year, to sign up participants.

These first four steps should win you 40-60% participation. Normal employee turnover necessitates one more step:

5. Urge each new employee, at the time he is hired, to sign up.

Nation-wide experience indicates that 50% of your employees can be persuaded to join—without high-pressure selling. All the help you need is available from your State Director, U. S. Treasury Department, Savings Bond Division.

The Treasury Department acknowledges with appreciation the publication of this message

This is an official U. S. Treasury advertisement prepared under the auspices of the Treasury Department and The Advertising Council.

New

Completely Enclosed Washing and Pickling Machine

Reduces Pickling Time to Less Than One-Third . . . Permits

Vast Reduction in Volume of Processing Solutions!

Complete Spray Pickling Equipment, with positive protection for continuous overhead monorail conveyor, is now available to porcelain enameling plants.

The new Mahon Hydro-Hermetic Seal (Patents Applied For) makes possible this noteworthy advance in the development of practical and economical equipment for the preparation of metal surfaces to receive porcelain enamel. The process is continuous through all operations.

Tanks and tunnel housing are of mild steel throughout except in areas where corrosive materials are in contact or fumes prevalent. In these areas, steel is lined with lead or rubber, or Monel Metal is employed. The monorail conveyor, which operates in the open above the machine, is fitted with Monel Metal adapters which are the load carrying medium that passes through the Hydro-Hermetic Seal—no spray or fumes can escape or work up the adapters to damage the conveyor.

The Hydro-Hermetic Seal, which seals the top of this machine throughout its entire length, greatly increases processing efficiency in each stage. It also prevents the loss of active chemical fumes, reduces ventilating requirements to a minimum, and eliminates both the necessity for a tremendous intake of air through an open conveyor slot—hitherto general practice, and the resulting necessity for replacement of air within the building.

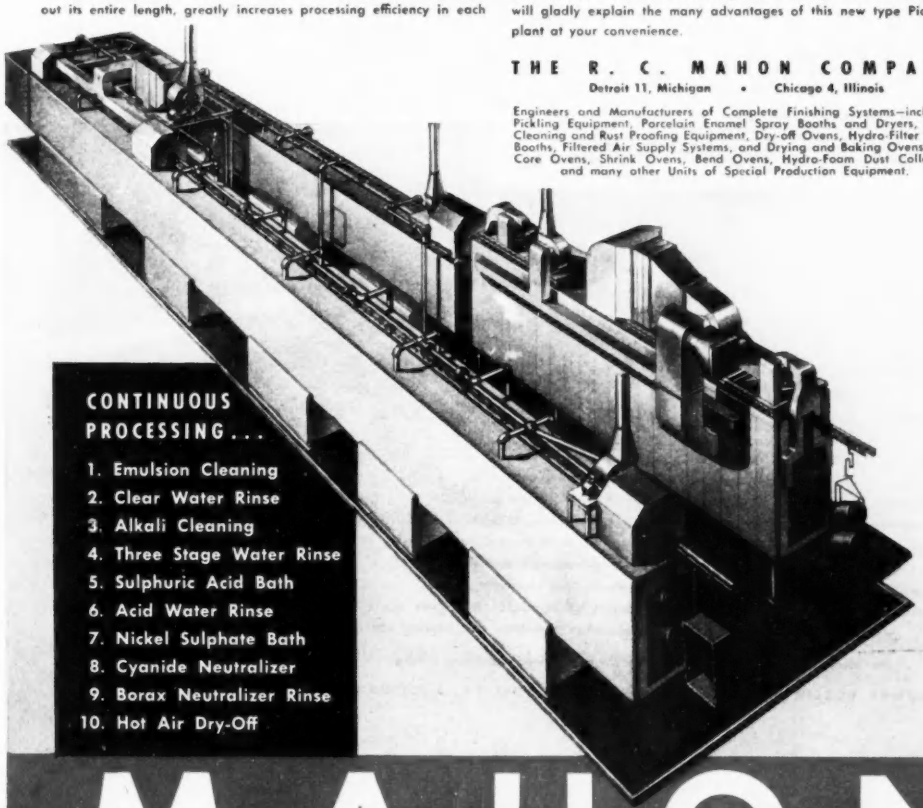
These Mahon Pickling Machines can be designed to meet any requirement of product processing, production rate, or plant layout.

Whatever your finishing requirements may be, whether it be Pickling Equipment, Porcelain Enamel Spray Booths, Dryers, Cleaning and Rust Proofing Equipment, or a complete Finishing System, you can turn to Mahon with complete confidence for the right equipment to do your particular job with utmost efficiency and economy. A Mahon engineer will gladly explain the many advantages of this new type Pickling plant at your convenience.

THE R. C. MAHON COMPANY

Detroit 11, Michigan • Chicago 4, Illinois

Engineers and Manufacturers of Complete Finishing Systems—including Pickling Equipment, Porcelain Enamel Spray Booths and Dryers, Metal Cleaning and Rust Proofing Equipment, Dry-off Ovens, Hydro-Filter Spray Booths, Filtered Air Supply Systems, and Drying and Baking Ovens. Also Core Ovens, Shrink Ovens, Bend Ovens, Hydro-Foam Dust Collectors, and many other Units of Special Production Equipment.



CONTINUOUS PROCESSING . . .

1. Emulsion Cleaning
2. Clear Water Rinse
3. Alkali Cleaning
4. Three Stage Water Rinse
5. Sulphuric Acid Bath
6. Acid Water Rinse
7. Nickel Sulphate Bath
8. Cyanide Neutralizer
9. Borax Neutralizer Rinse
10. Hot Air Dry-Off

MAHON

BOWER BEARINGS ARE

SPHER-O-HONED

YOU'LL AGREE . . .
THERE'S A BIG DIFFERENCE

Once you have used Bower Spher-O-Honed bearings you'll agree with the many who use them that here are truly outstanding bearings. They give consistently finer performance on every count. ★ Marked superiority is built into every Bower Spher-O-Honed bearing because of their basically different and greatly improved design—spherical roll-ends and flange surfaces, a large oil groove and higher cone flange—and because the most modern manufacturing technics are employed which produce micro-inch precision. ★ These are the significant advantages that explain the extra smoothness, longer life, and greater dependability of Bower Spher-O-Honed bearings . . . the big difference that makes them your best bearing buy.

For more complete information, write for the new Bower engineering catalog.

BOWER ROLLER BEARING COMPANY • DETROIT 14, MICHIGAN

BOWER

ROLLER BEARINGS

SPHER-O-HONED

MAINTENANCE COST FOR THESE 4 MACHINES:

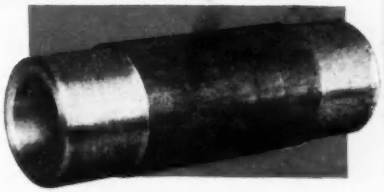
LESS THAN 2 7/10¢ PER HOUR

FOR 25,913 HOURS' CONTINUOUS PRODUCTION!

Here's a battery of four machines that has been continuously operating for 25,913 hours, producing a total of 1,215,853 pieces —and at an over-all maintenance cost of only $683.40. That figure covers both labor and materials.

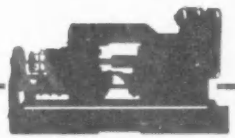
In other words, maintenance averaged only $170.85 per machine! And bear in mind, this remarkable record was made on heavy duty work—the kind that puts a machine to severe test for stamina and sustained accuracy.

Acme-Gridley Automatics are built with basic design advantages for such low-cost performance: The rigid, box-type frame resists vibration, *holds* precision on heavy cuts. Positive, direct, quick-change camming eliminates the need for adjustments to take up wear in loose-connected linkages. It will pay you to investigate Acme-Gridley Automatics when you want the most in metal turning—more good pieces in the pan—with minimum maintenance. May we give you more information?



JOB FACTS

Part: Track Link Bushing.
Size: 2⅝" Diam. x 8" long; 7½ lbs.
Material: Steel Tubing.
Machines: Acme-Gridley 2⅝" RB-8 Spindle Automatic Bar Machine.
Performance: Battery of 4 machines operating continuously for 25,913 hours.
Production: 1,215,853 pieces.
Maintenance Charges: $683.40 total (including labor and materials).



ACME-GRIDLEY BAR and CHUCKING AUTOMATICS built in 4, 6 and 8 spindle styles, maintain accuracy at the highest spindle speeds and fastest feeds modern cutting tools can withstand.

THE NATIONAL ACME COMPANY

170 EAST 131st STREET • CLEVELAND 8, OHIO

KELSEY-HAYES

Opens Los Angeles, California Plant to Better Supply Automotive Parts to West Coast Industries . . .

One of 8 specialized plants serving areas of major industrial expansion

new California Division, recently established and now operating at Los Angeles, provides fast expanding west coast industries with a great new source of superior automotive products. Like all other plants in nation-wide organization, serving major industrial areas, this new California Division has the "Know-How" to serve you best.

K-H ASSURES PROVEN PRODUCTS AT

KELSEY-HAYES WHEEL COMPANY

DETROIT 32, MICHIGAN

PRODUCTS: Wheels—Hub and Drum Assemblies—Brakes—Vacuum Brake Power Units—for Passenger Cars, Trucks, Buses—Electric Brakes for House Trailers and Light Commercial Trailers—Wheels, Hubs, Axles, Parts for Farm Implements.
PLANTS: Kelsey-Hayes Plants in Michigan (4); McKeesport, Pa.; Los Angeles, Calif.; Davenport, Iowa; Windsor, Ontario, Canada.

"CUBEE'S" know-how...

STARTS AT THE DRAWING BOARD

When it comes to plastics, "Cubee" knows all the answers—and that know-how starts at our drawing board. This business is like an infant in many ways—the first step is the toughest. That first step is the drawing board. There we design the molds which are made in our plant. We control the job from start to finish. If your problem calls for molded plastic parts—call "Cubee." We admit we can't answer *all* your problems. But, if your problem concerns plastics—well, that's something we *do* know!

Q-B Says:

"When your problem is plastics
Don't Lose your shirt
Remember that old adage,
'Consult an Expert'!"

QUINN-BERRY CORP.
2641l West 12th Street
ERIE, PENNSYLVANIA

Quinn-Berry Corp.
PLASTICS

Branch Offices

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On any Trucking Job—Air Brakes pay for themselves!

You can prove it with simple arithmetic. Just think of it in terms of your *own* business. With Bendix-Westinghouse Air Brakes, your trucks can carry bigger, heavier loads, faster and more safely—advantages that are bound to mean extra profits. Add to this, all of your savings on brake maintenance—your Bendix-Westinghouse distributor can give you case history after case history, showing that Bendix-Westinghouse Air Brakes not only save more than other *types* of brakes, but more than any other kind of *air* brakes. That's bonus performance you can rely on because Bendix-Westinghouse is the oldest and largest manufacturer in the field. Total up the assets and you'll agree, on any trucking job, Bendix-Westinghouse Air Brakes are the best investment a truck owner can make these days.

THE BEST AIR BRAKE IS

Bendix-Westinghouse

BENDIX-WESTINGHOUSE AUTOMOTIVE AIR BRAKE COMPANY
ELYRIA, Ohio

Ask your authorized Bendix-Westinghouse Distributor how you can save money on brake maintenance.

BENDIX-WESTINGHOUSE AIR BRAKES
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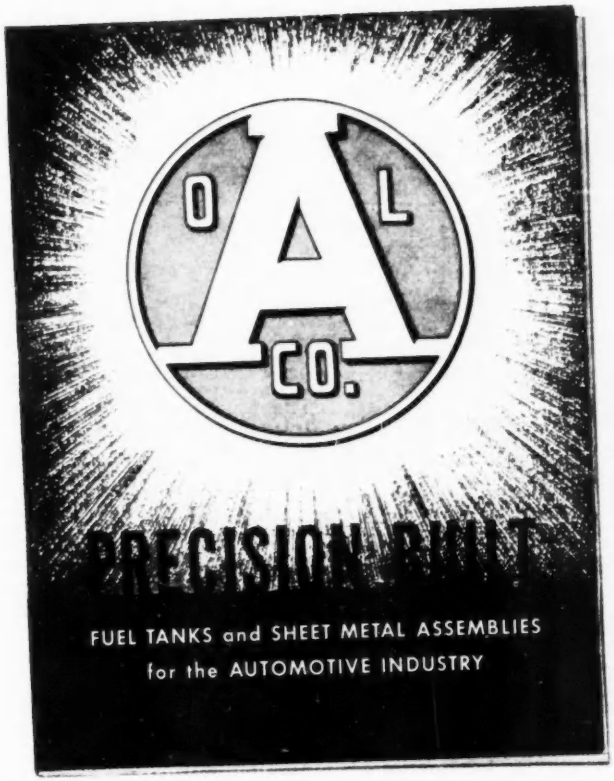

It will give you more information than we could put in an advertisement.

We have the facilities

We have the capacity

We have the experience

We have expert workers

May we help you?

O. L. ANDERSON CO. Inc.

Manufacturers of **FUEL TANKS AND SHEET METAL ASSEMBLIES FOR THE AUTOMOTIVE INDUSTRY**

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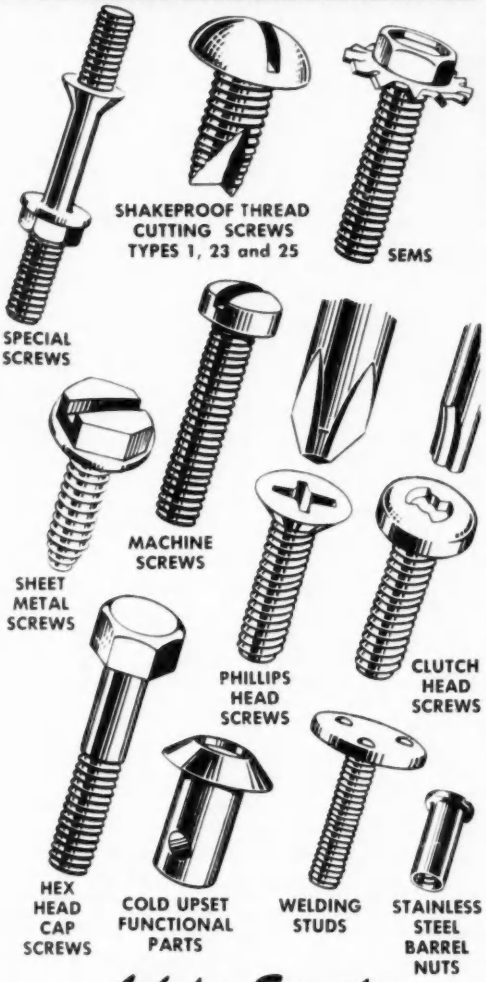
For Sale: Vickers Hydraulic Units, many Universal and General Hydraulic Test Stands complete with Variable 2008 FHAA and 2305 AH pumps driven by Louis Allis 10 H.P. motors. Also Dynamometers and stands adaptable to many aircraft model tests. Save 30-50% on pumps, stands, etc. Pictures, prints, full descriptive literature sent on request. Box 41, Kensington Station, Detroit 24, Michigan.

$25,000 year profit. Wholesale and retail automotive business. Established twenty-five years. Owner retiring. Price $85,000, which includes fixtures, equipment, rolling stock and $60,000 inventory. Jim McGinty, Business Opportunity Broker, 647 Central, St. Petersburg, Fla.

CAMCAR makes:



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YOU may be able to effect substantial savings by converting from the screw machine to the cold heading process.

CAMCAR SCREW & MFG. CORP.
606 18th Ave. Rockford, Ill.
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Representatives in Principal Cities

HI-EFF BALANCING

- *Fast*
- *Accurate*

This 250-pound blower fan is being balanced tc a 1 ounce inch on a HI-EFF Balancing Machine. The same Balancer is used for a wide variety of pieces up to 1200 pound size. It provides rapid balancing with accuracy indicated by the following tolerances:

Pieces weighing 500 to 1200 pounds, within 2 oz. inches.

Pieces weighing 75 to 500 pounds, within 1 oz. inch.

Pieces of lighter weights to diminishing tolerances down to .02 oz. inch.

HI-EFF Balancing machines are available in 5 sizes with work piece diameters up to 48 inches. These may be equipped with HI-EFF Hand Weighing Mechanism (as shown) or HI-MAX Direct Reading Mechanism. Write for folder "Balance Your Product."

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5111 W. CENTER STREET—MILWAUKEE 10, WISCONSIN

MANUFACTURERS OF "HI-EFF" Hydraulic Dynamometers Static Balancing Machines—Sensitive Drilling Machines

Index to

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Advertisers

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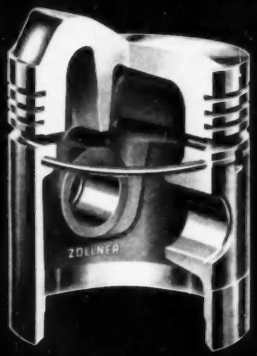

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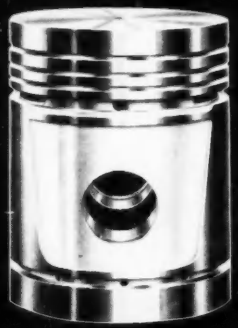

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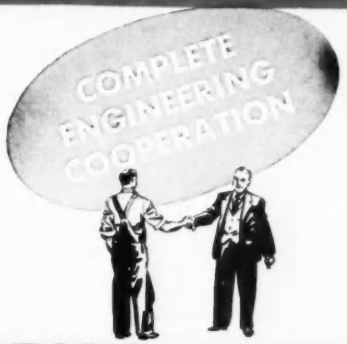

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Original Equipment in America's Finest Motors

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for INTERNAL COMBUSTION ENGINES —BOTH GASOLINE AND DIESEL

ZOLLNER MACHINE WORKS, FORT WAYNE, IND.

Spirolox saves machining • assembly time • parts • space • weight

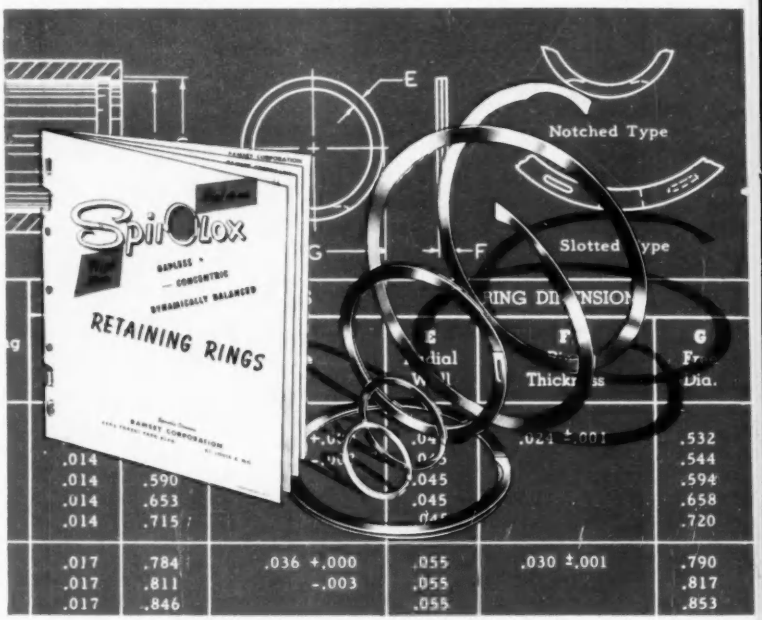
LATEST BULLETIN BRINGS YOU FURTHER FACTS ON REMARKABLE SPIROLOX RETAINING RING:

Complete Specification Data on External and Internal SPIROLOX

- Slotted Type
- Notched Type
- Ring Numbers
- Shaft Diameter
- Housing Diameter
- Groove Depth
- Groove Diameter
- Groove Width
- Radial Wall Dimensions
- Ring Thickness
- Free Diameter
- Approximate Weight

Complete General Specifications

- Material Used
- Tensile Strength
- Standard Finish
- Special Finish
- Diameters of Slots and Notches



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. . . the better way to hold moving parts together

How can SPIROLOX advanced "gapless" design help simplify your products? What are the simple steps in assembling and removing SPIROLOX? Can SPIROLOX be plated with Parco-Lubrite, Cadmium or Zinc?

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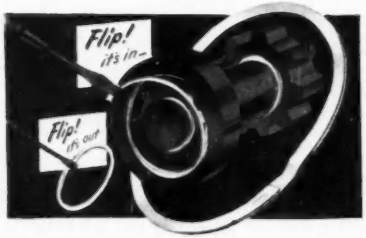

gapless • concentric • requires no special tools • easy-in, easy-out • re-usable • stays put

Patent Pending

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